

HISTORIC STRUCTURE REPORT

Schooner *C.A. Thayer*

National Park Service | June 2022



Headed for Bristol Bay, Alaska (1912), Source: NPS SAFR Archives, Photo J7.5,134n.



Architectural
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Schooner C.A. Thayer – Historic Structure Report

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Section One

Study Summary

INTRODUCTION

At the request of the National Park Service (NPS), Architectural Resources Group (ARG) prepared this Historic Structure Report (HSR) for the *C.A. Thayer* (PMIS 197264). The *C.A. Thayer* is one of six historic vessels at San Francisco Maritime National Historical Park (SAFR) and is the last surviving example of 122 sailing schooners especially designed for use in the 19th century Pacific Coast Lumber trade. The HSR documents the evolution of the vessel, describes modifications and existing conditions, outlines historic preservation objectives, and provides recommendations for an overall treatment approach. This document serves to inform future planning efforts for the vessel as San Francisco Maritime National Historical Park (SAFR) evaluates options for rehabilitation and continued use.

The *C.A. Thayer* was built by Hans Ditlev Bendixen at Fairhaven, on Humboldt Bay, California in 1895. The vessel was large for a three-masted schooner, measuring 452 tons, with a length of 156 feet, beam of 36 feet 8-inches, and an 11-foot 6-inch depth of hold. She was designed to carry 575,000 board feet of lumber. At the time of construction, *C.A. Thayer* represented the highest development of the new economical coastal lumber carrier. She was listed as a National Historic Landmark on November 13, 1966 and was subsequently placed on the National Register of Historic Places.

A draft Historic Structure Report (HSR) was written for the *C.A. Thayer* in 1991, but the document is incomplete and does not include details about the vessel's ongoing rehabilitation or its intended use. The ship underwent a major rehabilitation project in 2003-2006 to preserve and repair the ship's hull, deck, and keel. The vessel's internal structural

rehabilitation was completed in 2012, and work began to restore her rigging in 2014. Upgrades in 2020 included a new forward house enclosure and additional structural upgrades. Interior spaces will be completed by NPS shipwrights in the coming years.

Part III of the HSR was completed in March of 2020 and has been re-formatted to flow as part of this report. Although this preceded completion of Parts I and II, the Part III documents the major work completed in 2003-2006. The purpose of the current effort is to develop Parts I & II of the HSR, incorporating the 1991 draft and 2020 Part III document.

CONTENTS OF THE HISTORIC STRUCTURE REPORT

The contents of this HSR comply with NPS Director's Order 28: *Cultural Resource Management Guideline*, Chapter 8 and *Preservation Brief 43: The Preparation and Use of Historic Structure Reports*. This HSR conveys information about the design and construction of the *C.A. Thayer* in two main sections: 1) Developmental History and 2) Treatment and Use. The Developmental History section comprises a chronology of development and use; a historical background and context; a physical description and a list of character-defining features and materials; and a discussion of significance. This section also provides a comprehensive analysis of the ship's interior and exterior conditions.

The Treatment and Use section provides a comprehensive set of recommendations for the *C.A. Thayer*. The proposed treatment has been developed in accordance with *The Secretary of the Interior's Standards for Historic Vessel Preservation*

Requirements for Work

Projects with Guidelines for Applying the Standards (The Standards).

PROJECT GOALS

According to National Park Service *Preservation Brief 43*, an HSR provides documentary, graphic, and physical information about a resource's history and existing conditions. Broadly recognized as an effective part of preservation planning, an HSR also provides a thoughtfully considered argument for selecting the most appropriate approach to treatment prior to the commencement of work and outlines a scope of recommended work. The *C.A. Thayer* HSR serves as an important record of all changes made to the vessel to date, and as a guide for future treatment and use.

METHODOLOGY

The *C.A. Thayer* HSR has been developed using information gathered from existing documentation, meetings with NPS staff, archival research, and field investigation. The methodology employed for this report meets the standards and requirements set forth in the following documents:

- The Secretary of the Interior's Standards for Historic Vessel Preservation Projects with Guidelines for Applying the Standards
- NPS Director's Order 28: Cultural Resource Management Guidelines
- NPS National Register Bulletin 20: Nomination Historic Vessels and Shipwrecks to the National Register of Historic Places
- Preservation Brief 43: The Preparation and Use of Historic Structure Reports

Meetings

ARG attended an initial project meeting with representatives from SAFR on August 27, 2020. The project scope, objectives, coordination,

schedule, information gathering, compliance process, and procedures were discussed at this meeting. The initial project meeting also reviewed major site issues and management decisions that may impact the recommendations for treatment and use of the vessel. Those primary issues were further discussed at follow-up meetings on September 22, 2020, onboard the vessel on April 15, 2021, and on May 12, 2021. Separate meetings were held with only NPS staff to further discuss the primary issues and debate their impacts on park goals and operations. The issues under consideration were:

- Sailing capability and frequency
- Visitor access and egress, including disabled access to the vessel
- Interpretation and exhibits onboard
- Fire protection

Minutes from the meetings have been attached in Appendix H as a record of the discussions and conclusions.

Background Research and Data Collection

ARG visited the San Francisco Maritime National Historical Park Research Center at Fort Mason in October 2020 to collect existing primary and secondary source documents related to the *C.A. Thayer* and its development over time. The archival materials collected include historical photographs, maintenance and repair reports, and correspondence.

Field Investigation and Condition Assessments

ARG staff conducted initial field investigations while the ship was in dry dock in September 2020. An additional field visit was conducted in April 2021 to document existing conditions while the ship was docked at the Hyde Street Pier.

RESEARCH FINDINGS

A significant amount of research and context development for the *C.A. Thayer* was completed for the 1979 National Register of Historic Places Nomination, the 1988 Historic American Engineering Record Addendum, the 1991 Draft Historic Structure Report, and the February 2020 Part III Historic Structure Report. ARG has incorporated pertinent information from these documents into this HSR, updated information where relevant, and completed additional archival research to confirm and expand the historical record for the vessel.

MAJOR ISSUES IDENTIFIED

Following the recent, major restoration work described in Part III, the *C. A. Thayer* is in good condition without any major material issues. Issues instead relate to visitor access and use of the vessel, as discussed and considered at project meetings. The issues listed below are of particular importance to the park and are critical to how the park envisions the treatment and use of *C.A. Thayer*. Recommendations are focused on ship maintenance and improving visitor safety, access, and overall experience.

Sailing

Establishing the park's intentions for sailing *C.A. Thayer* was a major issue addressed during the HSR process. There is a strong desire to maintain the sailing capabilities of the vessel in some capacity, but preservation of the historic materials and character of the ship are most important. The vessel shall be made "sail ready" but will not be sailed on a routine basis or modified to become a U.S. Coast Guard-approved passenger carrying vessel. *C.A. Thayer* shall be sailed only occasionally under optimal weather conditions.

Exhibits and Visitor Interpretation

The *C.A. Thayer* does not currently have any exhibits or interpretive displays, but they are desired in the future. Interpretive panels or displays should be non-intrusive and still allow the primary visitor experience to be interacting with

the ship. A future exhibit design should be focused on recreating the "ready-made" status of *C.A. Thayer* from her first launch, including all the equipment, furniture, and supplies originally included. Collecting items for display would be aided by the completion of a Historic Furnishings Plan.

Visitor Access and Egress

There is currently no disabled access onboard the ship, and future access improvements are a priority but will require further study and custom design solutions. As a historic ship, *C.A. Thayer* has limited precedent governing safety and exiting regulations. Recommendations focus on limiting occupant numbers, offering access with NPS escort only, and negotiating with the applicable Authority Having Jurisdiction (such as the NPS Regional Fire Manager) to improve non-compliant conditions without negatively impacting historic fabric.

Fire Protection

Non-intrusive fire protection is a priority for the park, and a fire protection engineer was consulted during the HSR process.

RECOMMENDATIONS FOR TREATMENT AND USE

Previous and ongoing treatments at the *C.A. Thayer* follow a restoration approach, including replacement of missing or substantially deteriorated elements and recovery of the ship's original form. That approach remains applicable as further improvements related to the vessel's use as a museum and public interpretive site are made. Specific recommendations for major issues include:

Operational and General Recommendations

- Consult a naval architect before planning any sailing trips
- Maintain *C.A. Thayer* in a state to allow limited sailing trips in optimal conditions, primarily to and from dry dock
- Continue routine and preventative maintenance, including drydocking on a 4-year schedule.

Requirements for Work

General Architectural Recommendations

- Restore forward deckhouse to its historic configuration
- Create an exhibit design for the vessel
- Repair and restore finishes inside aft cabin

Safety and Accessibility Recommendations

- Limit occupancy onboard as recommended by the Regional Fire Manager
- Further study options for disabled access at the main deck
- Install exit signage and emergency lighting inside the hold
- Limit visitor access to areas without guardrails, such as with park escort only
- Negotiate with building officials to use reversible mitigation measures at non-compliant conditions inside aft cabin
- Provide equivalent facilitation measures for disabled access inside the hold and aft cabin

Fire Protection Recommendations

- Install an air sampling smoke detection system in the hold
- Install a security camera system onboard
- Install a water mist fire suppression system inside the deck houses

See Section 10 for more detail and the full list of work recommendations.

Section Two

Administrative Information

STRUCTURE INFORMATION

Original Name:	<i>C.A. Thayer</i>
NPS Preferred Structure Name:	Schooner C.A. <i>Thayer</i>
Current Name:	Schooner <i>C.A. Thayer</i>
Location:	San Francisco Maritime National Historical Park, San Francisco, California
Construction Date:	1895
Shipbuilder:	Hans Ditlev Bendixsen
Historic Use:	Lumber Schooner, Salt-Salmon Trade, Cod fishing Trade, Military Ammunition Transport
Current Use:	Education, Interpretation
Designations:	Designated as a National Historic Landmark on November 13, 1966

- Eric Lloyd Clements, "Historic American Engineering Record, Addendum to Schooner C. A. *Thayer*, HAER No. CA-61," September 1988.
- Tri-Coastal Marine, Inc., "Schooner C. A. *Thayer* Historic Structure Report - Draft," Prepared for the San Francisco Maritime National Historical Park, 1991.
- United States Department of the Interior, National Park Service, "Draft General Management Plan/Environmental Impact Statement, San Francisco Maritime National Historical Park," June 1996.
- Michael R. Harrison, "NHL Schooner C. A. *Thayer* Historic Structure Report – Part III," Prepared for San Francisco Maritime National Historical Park, February 2020.

PREVIOUS DOCUMENTATION AND STUDIES

For the preparation of this HSR, ARG reviewed several existing studies (listed in the Bibliography), including the following key reports:

- National Park Service, Western Division, "National Register of Historic Places Inventory Nomination Form, C. A. *Thayer*," September 20, 1979.

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Part I: Developmental History

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Section Three

Historical Background

INTRODUCTION

The historical overview below is adapted from the National Register nomination for the C. A. Thayer, completed by historians of the National Park Service in 1979; the Historic American Engineering Record report for Schooner C. A. Thayer, completed by historian Eric Lloyd Clements in 1988; a draft Historic Structure Report for Schooner C. A. Thayer completed by Tri-Coastal Marine, Inc. in 1991; and Part III of a Historic Structure Report completed by Michael R. Harrison in 2020. ARG has revised, condensed, and updated narrative components of these previous reports and completed additional archival research for the purposes of this document.

THE PACIFIC COAST LUMBER TRADE

From the early days of the Gold Rush in the 1850s through the Southern California building boom of the 1880s, California builders had an urgent and consistent need for lumber. In the earliest years, lumber was shipped from eastern markets to the West Coast around Cape Horn, but distance, cost, and occasional cargo losses motivated builders to establish a closer source. In the 1860s, lumber companies began to construct sawmills in the Pacific Northwest to process what seemed like the limitless Redwood and Douglas Fir trees therein. By 1866, close to 400 mills had been constructed along the coast of Northern California or very near inland, with many more established in the following decades in similar coastal locations in Oregon and Washington.¹

While the construction and operation of these mills was no small feat, the larger challenge for this new industry was getting the product to market.

The same dense forests that produced the bountiful harvest proved a formidable obstacle to constructing land transportation infrastructure in the form of roads or railroad tracks. The financial incentive to transport the lumber remained very powerful, as lumber that sold for \$10 per thousand feet at the mills of the Columbia River in Oregon fetched as much as \$500 per thousand feet at the commodities markets in San Francisco.²

The best solution was to move lumber by sea, although this also presented great obstacles. All of the harbors between the San Francisco Bay and Puget Sound in Washington were either out harbors, with little or no protection from the open ocean, or bar harbors, with dangerous sandbars at their thresholds. Rather than attempting to construct centralized shipping facilities at any of these suboptimal harbors, a network of about 100 smaller facilities was constructed to handle lumber shipping along the Pacific Northwest coastline. Most firms shipping lumber at these smaller facilities produced the lumber at their mills and shipped it south to San Francisco on vessels that they either owned or chartered. Once in San Francisco, the lumber was offloaded to yards and sold to builders either directly or through commission merchants.³

Nearly all of the smaller lumber shipping facilities were located at out ports referred to disparagingly as “dogholes.” The character of these ports can be further discerned by their names, including “Nip and Tuck,” “Hard Scratch,” and “Rough and Ready,” among others.⁴ Navigators were plagued in their approach to these ports by strong winds, powerful currents, and rocky shorelines.

¹ Eric Lloyd Clements, “Historic American Engineering Record, Addendum to Schooner C. A. Thayer, HAER No. CA-61,” September 1988, 6.

² Clements, 6.

³ Clements, 7.

⁴ Clements, 6.

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It was simply not possible to construct wharfage at most of these ports, and alternative loading methods had to be developed. Ships had to maneuver very close to shore and anchor in precise locations, where they were then held into loading position by mooring buoys and chains (Figure 1). Loading was done by lighters (transport barges), or, more commonly, chutes or cables. Chutes were long wooden troughs that were suspended from towers built into rock outcroppings along the shore and swung into place to enable lumber to slide into the hold or on to the deck of a moored ship. Wire cable loading systems, which gradually replaced chute loading systems by the turn of the twentieth century, relied on a long length of steel cable that was run from fixed towers to the rigging of a ship, along which moved a lumber-loaded platform called a trapeze.



Figure 1. Two lumber schooners at Mendocino Harbor, c. 1895.
Source: California State Library Digital Collection.

These unique and demanding conditions of the commercial lumber trade on the Pacific Coast gave rise to the need for a fleet of specialized vessels,

small sailing schooners capable of carrying large loads while also maneuvering in difficult locations.

THE PACIFIC COAST LUMBER SCHOONER

A schooner is a sailing vessel with two or more masts where the sails are aligned along the line of the keel (“fore-and-aft”) rather than perpendicular to the keel. Although generally thought to have been first developed by the Dutch in the 1600s, schooners were more significantly developed and used along the coast of the British North American colonies in the 1700s.⁵ Schooners had advantages in coastal sailing because they were smaller, faster, and more maneuverable, and could be operated by a smaller crew than square-rigged, cross-ocean ships. By the end of the eighteenth century the schooner had become the most common ship-type along the North American seaboard and was used almost exclusively for fishing and coastal trade routes. European shipwrights took note and began to produce schooners in larger numbers, at which point this versatile and adaptable ship-type became popular all over the world.

The Pacific Coast lumber schooner developed in response to the need for a specialized fleet of sailing vessels that could meet the unique and demanding conditions of the commercial lumber trade. Size was the most important factor in determining whether a ship could safely operate along the coast of the Pacific Northwest. A typical Pacific Coast lumber schooner was two-masted, and weighed less than 200 tons, often closer to 100 tons. They were made to sail without ballast, which reduced turnaround time on their generally short runs. Carrying capacity ranged from 75,000 to 150,000 board feet of lumber. Lumber was held above deck in well-secured piles, and below deck in an undivided hold, where it was loaded through lumber ports that could be located in the bow, port, starboard, or transom. And, lumber schooners were designed with a very shallow shoal

⁵ No author, “Schooner,” Encyclopaedia Britannica, published at

<https://www.britannica.com/technology/schooner>, accessed October 2, 2020.

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or draft, which allowed the vessel to navigate very close to shore and avoid the Pacific Coast's characteristic submerged reefs and rockbeds.⁶

Coastal schooners were worked by a small crew which generally included sometimes as few as four able-bodied seamen (a naval classification meaning a sailor who is experienced and qualified to do all necessary tasks to operate a ship), a carpenter or donkey man (responsible for the donkey steam engine), and the cook, along with an afterguard of two mates and the captain, sometimes joined by his wife and children.⁷ The work was considered dangerous, as it included approaching, mooring, loading and exiting rough doghole ports and shipping facilities, sometimes on a daily basis. But, the work was also notably well-paid, with wages as high as \$35 per month, more than double what was generally paid aboard deep-water trade ships.⁸ These ships also had a reputation as "good feeders," meaning the food was good and plentiful.

Lodging aboard lumber schooners typically saw the crew in a fore cabin with the captain and mates bunked in the aft cabin; however, the premium on deck space for cargo resulted in accommodations of similar sizes for all persons onboard. Divisions in rank were also generally less formal on lumber schooners than on larger ships, and out of necessity the captain and mates often loaded and unloaded lumber alongside sailors.⁹ Lumber schooners were most commonly captained and crewed by sailors of Scandinavian origin, who were generally experienced operating in rocky fjords and against strong currents.¹⁰ Because each doghole port had its own

complicated topography and demands, many lumber schooners returned to one or a handful of ports that they knew well, making quick turnaround trips between these ports and San Francisco, sometimes on voyages lasting a little as two days.

Schooners did yeoman service in the redwood lumber trade, linking the forests of the northwest with the developing urban areas of San Francisco and, later, Los Angeles. More than 500 wooden sailing vessels of over 100 tons were built on the Pacific Coast region between 1860 and 1905, with at least 122 known to have been dedicated exclusively to the commercial lumber trade.¹¹ They were gradually replaced after the turn of the twentieth century by wooden steam schooners, which had significant advantages in maneuverability and speed. By 1910, schooners under sail power were largely outmoded relics of an earlier age.

H. D. BENDIXSEN AND CONSTRUCTION OF SCHOONER *C. A. THAYER*

The lumber schooner *C. A. Thayer* was built by prolific master shipbuilder Hans Ditlev Bendixsen. Bendixsen was born in Thisted, Jutland, Denmark in 1842.¹² He learned shipbuilding as an apprentice in Denmark before moving to California in 1863. He worked in San Francisco and Eureka shipyards for several years before establishing his own yard in Eureka the late 1860s. Bendixsen built nineteen ships between 1869 and 1874, and in 1875 relocated his yard across Humboldt Bay to the

⁶ Clements, 7.

⁷ Clements, 10.

⁸ Clements, 9.

⁹ Clements, 9.

¹⁰ Clements, 7.

¹¹ Tri-Coastal Marine, Inc. "Schooner *C. A. Thayer* Historic Structure Report 1991 Draft," Prepared for San Francisco Maritime National Historical Park, National

Park Service, 1991, 9; National Park Service, Western Division, "National Register of Historic Places Inventory Nomination Form, *C. A. Thayer*," September 20, 1979 (entered), 3.

¹² Leigh H. Irvine, *History of Humboldt County*, California, Los Angeles: Historic Record Company, 1915, 809.

Historical Background

North Spit of Fairhaven, where he constructed 10 ships in 1875 alone.¹³

Within a few years Bendixen's Fairhaven yard encompassed a 14-acre facility with shops, sawmills, and cottages for 150 workers (Figure 2). Bendixen is known to have constructed 113 ships during his 35-year shipbuilding career on Humboldt Bay, including 39 two-masted schooners, 35 three-masted schooners, 11 four-masted schooners, one five-masted schooner, one brig, five barkentines, and ten steamers.¹⁴ He was regarded as "far and away the most prolific builder of the many shipbuilders" on Humboldt Bay.¹⁵ At the turn of the twentieth century Bendixen's health began to fail and in 1901 he sold his business for close to a quarter of a million dollars.¹⁶ Bendixen died in Eureka, California on February 12, 1902, and his body was returned to his home city in Denmark for burial.¹⁷

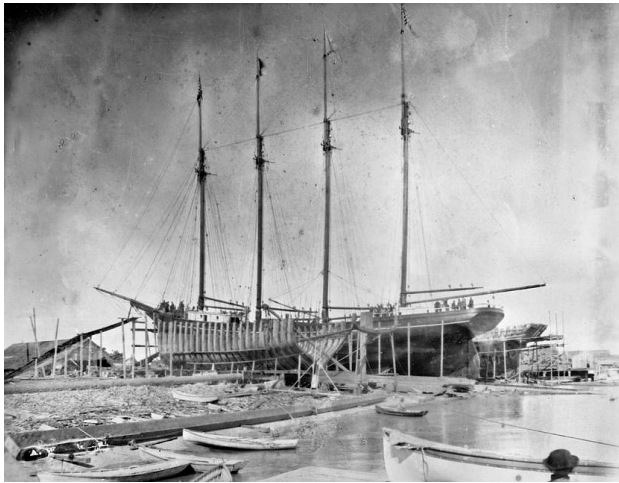


Figure 2. Bendixen's shipyard, Fairhaven, California, c. 1885.
Source: Mendocino Coast Model Railroad and Historical Society.

H. D. Bendixsen built the lumber schooner *C. A. Thayer* at his Fairhaven shipyard during the first six months of 1895. When launched on July 8, 1895, the occasion was festive, with a large crowd of observers both onboard the vessel and around it in smaller boats.¹⁸ Construction was commissioned by the E. K. Wood Lumber Company of San Francisco, and the ship was to be used for lumber transport between the company's mill in Hoquiam, Washington, in Grays Harbor close to Aberdeen, and their yard in San Francisco. Because the ship was intended to be used for a longer journey than the typical "doghole" coastal lumber schooners, it was larger than many lumber schooners: the *Thayer* was a three-masted schooner, with a length of 156', beam of 36', 11'8" depth of hold, and gross tonnage of 452.¹⁹ The *C. A. Thayer* was designed to carry 575,000 board feet of lumber, with about half in the hold and half on deck, and was outfitted with "all the latest marine appliances," including a steam powered "donkey" hoist supplied by Humboldt Iron Works.²⁰

Although the vessel was constructed for the coastal lumber trade, its maiden voyage was to the Fiji Islands with a near-capacity load of 560,000 feet of pine lumber.²¹ Once this voyage was complete, the *Thayer* began her career at her intended purpose, carrying lumber for the E. K. Wood Lumber Company.

SCHOONER C. A. THAYER

E. K. Wood Lumber Company Era (1895-1912)

The E. K. Wood Lumber Company was founded in San Francisco in 1895, and commissioned the construction of its first lumber schooner the *C. A. Thayer* that same year.²² The ship was named after Clarence A. Thayer, secretary of the company, although he owned no direct share in the ship. As

¹³ Clements, 4.

¹⁴ Irvine, 810; Clements, 4.

¹⁵ Clements, 4.

¹⁶ Irvine, 810.

¹⁷ Irvine, 810.

¹⁸ Clements, 3.

¹⁹ National Park Service (1979), 3.

²⁰ Clements, 3.

²¹ Clements, 3.

²² Clements, 5.

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was common practice of the era, ship ownership was split multiple ways – fourteen ways in the case of the *Thayer* – with the builder, the captain, the operator, and other interested parties and investors all sharing ownership and profits. H. D. Bendixsen owned a quarter share of the *Thayer*, much larger than typical for a builder, while the E. K. Wood Lumber Co. owned only a 1/16 interest, although they had commissioned its construction and served as managing owner, and as such were responsible for the regular operation of the vessel and the distribution of all profits to other shareholders.²³



Figure 3. C. A. *Thayer* docked at the E. K. Wood Lumber Co. yard at what is now Mission Creek Channel, c. 1900. Source: San Francisco Maritime Museum.

The E. K. Wood Lumber Company was established by Edwin Kleiber Wood in 1895 as manufacturers and dealers of pine and spruce lumber.²⁴ Wood was born in New York in 1840 to American-born parents of British ancestry.²⁵ After working for some years in the lumber trade in Michigan, he

relocated to San Francisco and established the E. K. Wood Lumber Co.²⁶ In 1896, the company's office was at 132 Market Street and their lumber yard was located on Channel Street, on the south side of what is now Mission Creek Channel near Fifth Street (Figure 3).²⁷

The E. K. Wood Lumber Co. grew quickly and by 1900 at least six additional ships were registered to its name.²⁸ At the time of E. K. Wood's death in 1917, the company was described as one of the largest lumber companies in the world, with timber interests in Washington and Oregon; lumber plants in Bellingham, Washington, and San Rafael, Oakland, and San Pedro, California; and a fleet of 12 steam schooners operating in the West Coast lumber trade.²⁹

For the first six years of her service, the *Thayer* was captained by C. W. Lilleqvist, under whose command the ship earned a reputation as a "smart" sailing vessel capable of making fast passages. In 1901, Lilleqvist was promoted to captain the E. K. Wood Company's new four-masted ship, and Ole Monsen became the *Thayer's* captain. From 1901 through 1912 the *Thayer* was captained by a series of men including Ole Monsen (1901-1904), Gus Peterson (1904-1908), Ingman (first name unknown; 1908-1910), Oscar Jacobson (1911-1912), and Fred Scott (1912).³⁰ During these years, the *Thayer* sailed regularly between E. K. Wood's Hoquiam, Washington mill and their lumber yard in San Francisco, or further on to the company's yard in San Pedro in Southern California (Figure 4). However, as steam schooners began to replace sail-powered schooners along coastal routes, some

²³ Clements, 5.

²⁴ Clements, 5; Crocker-Langley San Francisco City Directory, 1896.

²⁵ 1910 United States Federal Census for Edwin K. Wood.

²⁶ "Lumber King is Dead After a Year's Illness," *San Francisco Chronicle*, July 31, 1917.

²⁷ Crocker-Langley San Francisco City Directory, 1896.

²⁸ Clements, 5.

²⁹ "Lumber King is Dead After a Year's Illness," *San Francisco Chronicle*, July 31, 1917.

³⁰ Captain information copied from the records of the Marine Exchange, Pier 45-D, San Francisco, by John H. Plimpton, May 1963. Republished in "Notes on the C. A. *Thayer*," compiled by Ted Miles and Karl Kortum, 1988.

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sail-powered schooners, if they were large enough to make such an endeavor profitable, began to make longer cross-sea journeys that were not practical for their steam-powered replacements. Thus, after the turn of the twentieth century, the *Thayer* made several long, lumber-hauling journeys to Honolulu; Guaymas, Mexico; and Levuka, Fiji.³¹



Figure 4. C. A. Thayer loaded with lumber at the E. K. Wood Lumber Co. mill in Hoquiam, preparing to embark for Honolulu, 1912. Source: San Francisco Maritime Museum.

The *Thayer* made approximately 60 journeys in the 17 years it was operated by the E. K. Wood Company.³² The *Thayer's* last journey for the company began on January 5, 1912 when the ship embarked from Grays Harbor, Washington *en route* to San Francisco, with Captain Fred Scott, his wife, and a crew of seven men aboard.³³ Two days later, under heavy weather, the vessel began to experience threatening leakage.

The crew used hand pumps after the steam pump threatened to consume all of the ship's fresh water supplies. The hand pumps soon broke down as well, and the *Thayer* was in sinking condition twenty miles off the Humboldt Bar when she was sighted by the crew of the coast steamer *President* on the night of January 13.³⁴ On the morning of January 14, the fully waterlogged *Thayer* was taken under tow by the steam schooner *J. B. Stetson*, and together these ships, and importantly, their cargo, arrived safely in San Francisco Bay on January 16, 1912.³⁵ After unloading, the *Thayer* was moved to drydock in Alameda with a \$9,000 claim against her by the owners of the *J. B. Stetson*. The E. K. Wood Lumber Company made no move to rehabilitate the vessel and instead sold her to Peter M. Nelson in 1912.³⁶

Salmon Saltery Era (1912-1924)

In 1902, Peter M. Nelson established a salmon saltery on the Igushik River, at Bristol Bay north of the Alaskan Peninsula. By 1912 he was sufficiently successful that he constructed a second saltery on the Igushik River, and purchased and repaired the *C. A. Thayer*, for a price around \$10,000 (Figure 5).³⁷ The following year, he built a third operation at Squaw Creek, nearby his other two salteries, on the estuary of the Kvichak River at Bristol Bay.

Salmon salting was a relatively minor industry in Alaska and could be undertaken with a small outlay of capital.³⁸ In April, prior to the start of the short fishing season, Nelson used the *Thayer* to ship supplies from the south, including salt, fishing equipment, hoops to bind barrels, and a small crew of men to operate the saltery, along with all

³¹ Clements, 11.

³² Arrival and departure information copied from the records of the Marine Exchange, Pier 45-D, San Francisco, by John H. Plimpton, May 1963. Republished in "Notes on the *C. A. Thayer*," compiled by Ted Miles and Karl Kortum, 1988.

³³ National Park Service (1979), 5.

³⁴ Clements, 16.

³⁵ Clements, 16

³⁶ National Park Service (1979), 5.

³⁷ Clements, 16.

³⁸ Pat Roppel, "Salting Salmon in Taku Inlet," Alaska Historical Society Blog, published January 26, 2013, at <https://alaskahistoricalsociety.org/tag/saltery/>, accessed September 25, 2020.

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of the personal supplies and materials needed for operating the salteries. The hold of the *Thayer* was modified with the installation of a temporary platform in the fore part of the hold (fisherman's forecastle) with approximately 30 bunks for fishermen and other saltery workers.³⁹ These bunks were dismantled once the ship arrived in Alaska and the wood put to other uses for the course of the summer.



Figure 5. C. A. Thayer under sail during first voyage to Bristol Bay, Alaska, 1912. Source: San Francisco Maritime Museum.

Peter M. Nelson was born on Öland Island, off the east coast of Sweden, and he recruited his crew largely from a saloon in San Francisco called the Öland King Bar, where other Öland Islanders gathered.⁴⁰ Once in Alaska, a cooper with a handful of tools would fell several trees and assemble the needed barrels. Fishermen used skiffs and seine nets to harvest sockeye salmon, in or close to the mouth of a known fish stream or river. The harvest was processed by the “dressing gang” in rough wooden sheds, then moved to deep wooden vats where it was packed and salted. At the end of the season the salted salmon were packed into 200-pound capacity barrels for shipping.⁴¹

During these summer months, the *Thayer* sat anchored on the Kvichak River. In September, at the close of the season, the *Thayer* was loaded with barrels full of salted salmon, supplies, and the

crewmembers for the return voyage to San Francisco, where the salted salmon was sold at southern markets and beyond. The *Thayer* spent winters laid up in Oakland Creek (now Oakland Estuary) where she was repaired and refitted in preparation for the next year's voyage.

In the early decades of the twentieth century, several factors made sail-powered lumber schooners, which were largely outmoded by that time in the industry for which they were built, ideal for use in the Alaskan fishing industry. Nelson's saltery, like all other Alaskan undertakings, was thousands of miles from any developed city or port. Supplies and skilled laborers needed to be imported every spring and exported every fall, and the journey usually took about a month. Sailing ships had the physical capacity for this task, and, because these voyages embarked well before the beginning of the season and there was no economic necessity for their speedy return in the fall, they were not penalized for slow speed, especially when these ships could be purchased for cheap. Additionally, while fishermen were paid in part with a flat monthly rate, the majority of their pay was based on their summer catch, so an extra month of sailing at the end of each season cost the owners very little. For these reasons, many old sailing ships found second lives in the Alaskan fishing industries after steamships drove them out of other industries.

The *Thayer* returned to its historic use as a lumber schooner during World War I, when Peter M. Nelson capitalized on high freight rates that arose from the overall shortage of shipping vessels during the War. During the winter season of 1915-1916, and the three following winters, the *Thayer* sailed in October for Australia, twice with Northwest fir in her hold and twice with Mendocino redwood. Returning in March she brought coal from Newcastle or copra (dried coconut for making coconut oil) and hardwood

³⁹ Clements, 20.

⁴⁰ Clements, 18.

⁴¹ Clements, 20.

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from Sydney.⁴² After the 1918-1919 winter season voyage, the *Thayer* never again carried the cargo for which she was constructed.

Salted salmon experienced a brief surge in demand during the Emergency Relief Period directly after World War I, but by the by the 1920s, the industry was in steep decline and Peter M. Nelson was considering retirement.⁴³ On February 7, 1925, Nelson sold his complete operation, including the salteries, fishing boats, and the C. A. *Thayer*, to the A. & P. Products Corporation, who opened a large fish cannery at the site of Nelson's Squaw Creek saltery.⁴⁴

Pacific Coast Codfish Co. Era (1924-1941; 1946-1954)

A. & P. Products Co. appears to have had no use for an aging sail-powered schooner and sold the *Thayer* to John E. Shields before the start of the 1925 fishing season for the price of \$1.60.⁴⁵ Captain John E. Shields was part-owner, manager, and salesman for the Pacific Coast Codfish Company, based in Poulsbo, Washington. Under its new owner, the vessel left San Francisco Bay in March 1925 with a hold full of salt, headed at a rapid clip to Seattle to take on crew and equipment in time for an April sailing to the Bering Sea (Figure 6).⁴⁶

The endeavor of codfishing on the Bering Sea came with specific logistical requirements which older, three-masted lumber schooners such as the *Thayer* were uniquely qualified to meet. The great distance of the fishing grounds from any port required the use of large vessels, capable of staying out at sea a long time – sometimes up to six months – and carrying a large cargo. Because there was not a daily rush to return to market, speed counted for nothing, enabling the *Thayer* and many of the remaining similar outmoded lumber schooners of her era to remain relevant as

cheap and “adequate” transportation for the codfishing industry.



Figure 6. Men securing codfishing dories aboard the C. A. *Thayer*, undated photograph, c. 1930s. Source: San Francisco National Maritime Park Digital Archive.

John Grotle captained the *Thayer* during these years and remained in command of the vessel for seven seasons. At the close of Grotle's seventh season, in the spring of 1931, the *Thayer* returned to Poulsbo with 302,000 fish in her hold, the largest catch ever recorded by an American schooner from the Bering Sea at that time.⁴⁷

However, after 1931, declining prices for salt cod motivated the Pacific Coast Codfish Company to idle the *Thayer* in the fresh water of Lake Union (Seattle) where she stayed for the remainder of the decade. After several years spent during World War II as a U. S. Army transport barge (described further below), the *Thayer* again sailed for the Bering Sea in 1946, where she completed a total of

⁴² National Park Service (1979), 3.

⁴³ Clements, 25.

⁴⁴ National Park Service (1979), 3.

⁴⁵ National Park Service (1979), 4; Clements, 25.

⁴⁶ Clements, 25.

⁴⁷ Clements, 26.

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five more seasonal voyages for the codfish industry.⁴⁸

While some of the modifications made by the Army improved the vessel for its last voyages, Shields needed to reverse other changes. He replaced the removed masts with masts from another Codfish Company vessel, the *Sophie Christenson*, and also installed that ship's bowsprit. It was in this condition that the *Thayer* worked its last seasons in the codfishing industry.

In 1950, her last season at sea, the *Thayer* was the last operating commercial schooner on the Pacific Coast, a unique anachronism from an era when sail dominated the seas. John E. Shields laid the *Thayer* up in Lake Union, Seattle where she remained until 1954.

Wartime Service Era (1941-1946)

The U. S. Army bought the *C. A. Thayer* from the Pacific Coast Codfish Company in 1941 for use as an ammunition transport barge during World War II in British Columbian and Alaskan waters. In addition to expensive repairs and reinforcements to the stern, Army engineers made major modifications to the vessel including cutting out the three masts and enlarging the hatches. After four seasons of use, the Army sold the vessel back to Captain Shields of the Pacific Coast Codfish Company.

Roadside Attraction Era (1954-1957)

In October of 1954 John E. Shields sold the *C. A. Thayer* to Charles McNeal of North Lilliwaup, on the Hood Canal in Washington.⁴⁹ McNeal prepared the vessel for use as a tourist attraction by digging out a berth at his waterfront lagoon, where the *Thayer* would float at high tide and sit on the gravel bottom at low tide. He also removed the existing ladder down to the codfishing-era

fisherman's forecastle and installed a new ladder.⁵⁰ McNeal opened the ship to the public around 1955 and advertised the attraction as the pirate ship *Black Shield*.⁵¹ The vessel served in this role for two years.



Figure 7. *C. A. Thayer operating as a tourist attraction in the Hood Canal, undated, c. 1955. Source: San Francisco National Maritime Park Digital Archive.*

California State Ownership Era (1957-1977)

In the early 1940s, mariner and sailing ship enthusiast Karl Kortum began to muster public support for the establishment of a museum in San Francisco dedicated to the maritime history of the Pacific. After almost ten years of planning, the San Francisco Maritime Museum opened to the public in 1951. In 1955 the museum secured \$200,000 in state funding to purchase several historic vessels.⁵² Only two three-masted coastal lumber schooners survived on the West Coast at this time, down from what had been an active fleet of well over a hundred around the turn of the twentieth

⁴⁸ Tri-Coastal Marine, Inc., Schooner *C. A. Thayer* Historic Structure Report 1991 Draft, Prepared for the San Francisco Maritime National Historical Park, 1991, 17.

⁴⁹ Clements, 31.

⁵⁰ Clements, 32.

⁵¹ Clements, 32.

⁵² National Park Service (1979), 5.

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century.⁵³ The *Thayer* was the only remaining example of this type that could be purchased for a reasonable price, and the California State Department of Natural Resources, Division of Beaches and Parks approached Charles McNeal in 1955 with an offer. After more than a year of negotiation, the sale was completed in June 1957, and McNeal was paid \$25,450 for the ship.⁵⁴

The *Thayer* was in poor condition at purchase and was towed to Lake Union Drydock in February 1957 for extensive repairs with the goal of sailing to her new home in San Francisco Bay. After repairs and rerigging, the *Thayer* embarked from Puget Sound for San Francisco in September 1957; after two weeks of inclement weather, a Coast Guard Cutter took the ship in tow and the *Thayer* arrived in San Francisco in October 1957.⁵⁵

After additional seasons of haul-out and repair the *Thayer* was opened to the public at the San Francisco Maritime State Historic Park at Hyde Street Pier on October 2, 1963. The objective of the exhibition at the time was to tell the story of all three of the vessels' careers and the restoration goal was to return the ship to a representative of her type rather than attempt an exact reproduction of her original form.⁵⁶ The interpretive captions and labels placed on the ship were developed by the staff of the San Francisco Maritime Museum.⁵⁷ The *C. A. Thayer* was designated a National Historic Landmark on November 13, 1966 (Figure 8).

A maintenance cycle of haul-outs and repair was developed and varyingly achieved in the following decade, as funding remained short and the need and cost of repair remained high.



Figure 8. *C. A. Thayer* at the San Francisco Maritime State Historic Park at Hyde Street Pier, 1965. Source: National Register Nomination, 1966.

National Park Service Ownership Era (1977-present)

In 1977 the San Francisco Maritime State Historic Park and its ships were transferred to the National Park Service as part of the newly-established Golden Gate National Recreation Area.⁵⁸ Staff of the National Park Service prepared a National Register of Historic Places Nomination Form for the vessel in 1978 and the *C. A. Thayer* was listed on the National Register on September 20, 1979.⁵⁹ Under operation by the National Park Service, the *C. A. Thayer* was visited by an average of 200,000 persons a year, including school children taking part in overnight programs run by the National Park Service's non-profit partner the San Francisco Maritime National Park Association (formerly the National Maritime Museum Association).⁶⁰ The San Francisco Maritime National Historical Park and its historic vessels became a separate administrative unit of the National Park Service in June of 1988.⁶¹

⁵³ National Park Service (1979), 5.

⁵⁴ Clements, 32.

⁵⁵ Clements, 32.

⁵⁶ Clements, 33.

⁵⁷ Tri-Coastal Marine, Inc., 22.

⁵⁸ National Park Service (1979), 8.

⁵⁹ National Park Service (1979), 1.

⁶⁰ Harrison, 4.

⁶¹ Michael R. Harrison, "NHL Schooner *C. A. Thayer* Historic Structure Report – Part III," Prepared for San Francisco Maritime National Historical Park, February 2020, 3.

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Figure 9. C. A. Thayer returning to San Francisco under tow following haul-out and repair at a local shipyard, 1988. Source: San Francisco Maritime Museum.

Through the 1970s and 1980s the *Thayer* underwent semi-regular haul-outs for both routine and emergency repair, maintenance, and restoration (Figure 9). Seven surveys and preservation assessments over the course of this period documented progressive and increasing deterioration of the *Thayer*'s hull, with rot, damage from marine borers, and hog in the keel reported as the vessels' leading challenges.⁶²

In response to these dire reports, the Park Service solicited several professional assessments and convened internal committees to discuss an appropriate preservation approach. The primary subject under consideration was whether removing and replacing remaining historic material would constitute an irreparable loss of integrity for the historic resource. While some parties advocated for the maximum preservation of historic material, the consensus opinion coalesced around the idea that ships in their active lives were subject to ongoing repair, and thus the preservation of a historic vessel should allow for the ongoing replacement of historic materials with in-kind replacement without suffering a loss of

integrity.⁶³ These findings were restated in a 1999 planning document issued by the National Park Service in 1999, and further advanced in a 2002 environmental assessment document issued by the National Park Service for the rehabilitation of the *Thayer*.⁶⁴

The hull of the *C. A. Thayer* was restored in a multi-year effort from 2003 through 2007. Park historian Stephen Canright described the work as "easily the largest wooden merchant shipbuilding project completed in the United States since the 1920s."⁶⁵ The team assembled to conduct the work included staff of the San Francisco Maritime National Historical Park; naval architecture firm Designers and Planners, Inc.; shipbuilder Allen Rawl; Defense Logistics Agency to acquire needed wood; and Bay Ship and Yacht Company of Alameda as the contractor.⁶⁶

The effort to source timber of the right size and quality for restoration of the *Thayer* had begun in 1991 when the first broad restoration plan was formulated.⁶⁷ To achieve historical and structural integrity, timber was needed of sizes and quality not commonly available in the market. Sourcing from the Forest Service was curtailed by injunctions resulting from threatened and endangered species litigation, and only one private mill on the West Coast would even provide cost estimates for timbers longer than 60 feet in length. A small portion of new wood was provided by Sylvan Forest Products, although portions of the original order were rejected due to quality. The timber for the project was eventually sourced through an interagency acquisition agreement with the Defense Logistics Agency in December 2001, which sourced the 431,258 board feet of

⁶² Harrison, 5.

⁶³ Harrison, 5.

⁶⁴ Harrison, 4.

⁶⁵ Harrison, 8.

⁶⁶ Harrison, 8.

⁶⁷ Harrison, 13.

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lumber, in dozens of atypical sizes, needed for the *Thayer* reconstruction.⁶⁸

The rehabilitation corrected a variety of significant long-standing structural problems with the *Thayer*, including extensive pervasive wood rot, hog in the keel, deterioration of steel fastenings, structural weakness in the stern, incorrect shape of the transom and stern overhang, unoriginal deck hatch openings, inconsistent deck camber, and a large missing portion of the vessel's wormshoe.⁶⁹ The project sought to employ techniques and materials that reflected the *Thayer's* original construction. These included replacing deteriorated Douglas fir components with new Douglas fir, in the same lengths as originally used when possible; retaining structurally sound material in the keel, lower frames, and hull bottom planking; fastening planking with trunnels rather than metal fasteners; shaping replacement frames to duplicate deteriorated frames and fitting to their specific locations within the hull; replacing thick ceiling planking in kind with 80-foot lengths of 8-inch fir; constructing thick ceiling planking at the bow and stern using a double layer of 4-inch planks to match original construction; and caulking in the traditional manner with cotton, oakum, and tar under the guidance of master caulkers.⁷⁰ Departures were made from original techniques in the use of modern fungicide and wood preservatives, and in the use of modern finishes on painted surfaces, which offer superior protection.

In addition to structural restoration, some features of the *Thayer* were changed in an effort to generally return the vessel to its original 1895 construction. These changes included returning the main and forward hatches to their original size; redesigning the forward deckhouse to reflect its original size and layout (not completed during this

period of restoration); eliminating the fish handling ports at the midship port and starboard bulwarks; eliminating the square scupper above waterway to port and reconfiguring the scuppers to pass through the waterway timbers as originally designed; removing the fisherman's forecastle and placing its components in storage, removing the false sole in hold; and eliminating hawse pipes that had been installed through the poop deck bulwark in order to moor the vessel at Hyde Street Pier.⁷¹ The majority of the vessel's equipment and fittings, such as steering gear, hold ladders, anchors, catheads, and others, were retained over the course of restoration.⁷²

Funding for the *Thayer* reconstruction came largely from federal line-item appropriations between 2002 and 2005; additional funding came from the Regional Cultural Resources program and the annual budget of the San Francisco Maritime National Historical Park.⁷³ The *Thayer* returned to Hyde Street Pier in April 2007.⁷⁴

In 2009, the *Wawona*, which was the only other surviving West Coast lumber schooner, was dismantled by its owner, the nonprofit educational organization Northwest Seaport, and in 2011 San Francisco Maritime National Historical Park acquired some components of that ship to replace missing and damaged components of the *Thayer*.⁷⁵ Park Historic Ship Rigging Supervisor Courtney Andersen described the decision as such: "We feel it is to the best practices and standards for historical vessel restoration to use items of a similar age and origin in replacement parts, rather than fabricating new pieces or using parts that came from later, dissimilar vessels. It would bring the *Thayer* as close as possible to her original condition..."⁷⁶

⁶⁸ Harrison, 13-15.

⁶⁹ Harrison, 9.

⁷⁰ Harrison, 9.

⁷¹ Harrison, 10.

⁷² Harrison 11.

⁷³ Harrison, 12.

⁷⁴ Harrison, 21.

⁷⁵ Harrison, 22.

⁷⁶ Harrison, 23.

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In 2012, an additional scope of hull restoration work was completed at Bay Ship and Yacht Company in Alameda. In 2014, park staff completed a project scope and technical specifications for a multiyear project to rerig the *Thayer* to reflect its historic rig design.⁷⁷ Plans were developed based on historic photographs, documents, and drawings in the collection of the San Francisco Maritime National Historical Park; construction contracts for similar lumber schooners; construction drawings from other Bendixsen-built schooners; and historic metal and wood fittings from other rigs in the park's collection, including items collected from the *Wawona*. The first and larger phase of rerigging was completed at Bay Ship and Yacht in Alameda between 2015 and 2017 and cost close to \$2.3 million. Work included fabricating and installing spars, laminated spar masts, and associated iron work, among other tasks. Between 2017 and 2019, additional rigging, sparring, and treating work was completed by park shipkeeping staff at Hyde Street Pier.⁷⁸

Restoration work at the afterhouse started shortly after 2007 and has continued intermittently to the present day. Under the supervision of a series of shipwrights including Phil Erwin, Jeff Morris, Thomas McKervey, and Josh Brown, afterhouse restoration work has included documentation of exterior sheathing to allow patterning of the perimeter logs; removal of exterior sheathing; replacement of all perimeter logs; scarf jointed repairs to the ends of the deck beams; replacement of the afterhouse decking; and installation of new sheathing. Windows, slides, and shutters have been restored or replicated as necessary, the interior is undergoing restoration, and the original historic panels are being reinstalled.⁷⁹

In 2020-2021, the *Thayer* underwent a period of haul-out wherein a significant number of

outstanding restoration details were addressed. Among the most significant components of this phase of work was the restoration of the forward deckhouse. The substantial portion of the deckhouse that was constructed in the 1940s was removed in 2003 with only the front six feet believed to be original and retained. Restoration plans reconstructed the original footprint and planned future work will configure the interior layout to reflect what is believed to be a historically accurate arrangement, with four compartments including a forecastle with six berths forward, a galley and cooks' room in the middle, and a donkey engine room aft. The retained historic portion of the deckhouse was used as a source of information from which construction and cladding details were extrapolated and reproduced.

With the completion of this scope of work the effort to thoroughly restore the structural and historic integrity of *Thayer*, begun in the early 1990s, is complete. The vessel retains and conveys its historic appearance as it was constructed in 1895 as a West Coast lumber schooner and can continue its museum and interpretive role into the future.

⁷⁷ Harrison, 24.

⁷⁸ Harrison, 27-28.

⁷⁹ Harrison, 28-29.

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Section Four

Chronology of Development and Use

DEVELOPMENT CHRONOLOGY

This chronology presents information from a variety of existing sources, including the National Register nomination for the *C. A. Thayer*, completed by historians of the National Park Service in 1979; the Historic American Engineering Record (HAER) report for Schooner *C. A. Thayer*, completed by historian Eric Lloyd Clements in 1988; a draft Historic Structure Report for Schooner *C. A. Thayer* completed by Tri-Coastal Marine, Inc. in 1991; and Part III of a Historic Structure Report completed by Michael R. Harrison in 2020. These existing sources include architectural drawings, historical photographs, maintenance and repair reports, and related correspondence. Archival research conducted by ARG in 2020 and 2021 supplements the existing material.

1848	Gold is discovered at Sutter's Mill in the foothills of the Sierra Nevada Mountains, which initiates a massive population influx in the Bay Area of California and a coincident need for constant and abundant lumber.
c. 1868	Danish-born shipbuilder Hans Ditlev Bendixsen establishes shipbuilding yard in Eureka, California, on the east side of Humboldt Bay.
1869-1900	H. D. Bendixsen constructs over 100 ships and is regarded as the most prolific of the many shipbuilders on Humboldt Bay.
1875	H. D. Bendixsen moves his shipbuilding yard to Fairhaven on the west side of Humboldt Bay, which within a few years covers 14 acres including shops, sawmills, and housing for 150 workers.
1895	E. K. Wood Lumber Company forms, with mills located in Hoquiam, Washington and lumber yard and sales offices in San Francisco.
July 8, 1895	<i>C. A. Thayer</i> launched from the Fairhaven shipyard of H. D. Bendixsen under command of Captain C. W. Lilliquist. Ownership team includes 19 persons and entities, with $\frac{1}{4}$ share retained by the builder, and E. K. Wood Lumber Company serving as the managing owner. The ship was named for E.K. Wood Company secretary Clarence A. Thayer. Though constructed for the Pacific Coast lumber trade, the vessel's first voyage was to Fiji with a load of fir wood.

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1895-1912	<i>C. A. Thayer</i> works as a lumber carrier for managing owner E. K. Wood Lumber Company, transporting lumber between the company's mill in Hoquiam, Washington and its yard in San Francisco, as well as other West Coast ports including San Diego and San Pedro (Los Angeles), and Hawaii, Fiji, and Mexico.
1901	Ole Monson becomes captain of the <i>Thayer</i> after C. W. Lilliquist was promoted to captain of a new, larger ship operated by E. K. Wood Co.
1901-1912	<i>C. A. Thayer</i> captained by a series of men including Ole Monsen (1901-1904), Gus Peterson (1904-1908), Ingman (first name unknown; 1908-1910), Oscar Jacobson (1911-1912), and Fred Scott (1912).
January 1912	On January 14, the <i>C. A. Thayer</i> radioed for assistance while leaking badly and in immediate danger of sinking about 20 miles off the Humboldt Bar. The <i>Thayer</i> was rescued by steamer <i>J. B. Stetson</i> and towed to San Francisco Bay. Owners of the <i>Stetson</i> filed a \$9,000 salvage claim on the <i>Thayer</i> . E. K. Wood Co. opted not to pay this claim or complete necessary repairs to the <i>Thayer</i> , and instead laid the ship up in Oakland.
Spring 1912	Peter M. Nelson, purchased <i>C. A. Thayer</i> from the E. K. Wood Co. for about \$10,000, for use in his salmon saltery operations at Bristol Bay, Alaska.
April 28, 1912	<i>C. A. Thayer</i> departs San Francisco Bay for first season of work in the salmon saltery business.
1912-1924	<i>C. A. Thayer</i> works as a transport ship for Peter M. Nelson's salmon saltery operations, departing San Francisco Bay in April loaded with supplies including salt, fishing equipment, hoops to bind barrels, and a small crew of men to operate the saltery, along with all of their personal supplies and the materials needed for operating the salteries; sitting anchored on the Kvichak River during summer months; returning to San Francisco Bay in September loaded with barrels full of salted salmon, supplies, and men; and repaired and refitted at a shipyard in Oakland Creek (now Oakland Estuary) during winter months, in preparation for the following season's voyage.
1915-1919	During these years, the <i>C. A. Thayer</i> made four off-season (October-March) voyages to Australia. Transport ships were in short supply during World War I and Peter M. Nelson capitalized on high freight rates shipping Redwood and pine lumber to Australia and returning with hardwood, copra (dried coconut used for making coconut oil), and coal.
February 7, 1925	Peter M. Nelson sells all of his company holdings to A. & P. Products Corporation, including salteries, fishing boats, and the <i>C. A. Thayer</i> .
February 1925	Captain John E. Shields, principal owner of Pacific Coast Codfish Company of Poulsbo, Washington, arranges to buy the <i>C. A. Thayer</i> while the vessel is in drydock in Oakland. Shields repaired and refitted the vessel for codfishing use and departed San Francisco Bay for Puget Sound, Washington in early March 1925.

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April 13, 1925	A. & P. Products Corporation sells the <i>C. A. Thayer</i> to Captain John E. Shields for the sum of \$1.60.
April 26, 1925	<i>C. A. Thayer</i> departs Seattle, Washington for first season of codfishing in the Bering Sea. Upon return to port in September 1925 the <i>Thayer</i> held 256,160 fish, the largest catch of the Puget Sound codfishing fleet.
1925-1931	<i>C. A. Thayer</i> works as a codfishing vessel for Pacific Coast Codfish Company, departing Puget Sound in the spring months, usually April, carrying fishermen, dories, and salt to the codfishing grounds of the Bering Sea, remaining at sea for six months before returning to the Puget Sound in the fall, usually September. All seven seasons were captained by John Grotle, and the average catch was 250,000 fish.
September 1931	<i>C. A. Thayer</i> returned to Poulsbo, Washington with 302,000 fish in her hold, the largest catch ever recorded by an American schooner from the Bering Sea at that time.
1931-1941	The Great Depression and reduced demand for salted cod compelled the Pacific Coast Codfish Company to reduce their active fleet, and the <i>C. A. Thayer</i> is laid up in the freshwater port of Lake Union, Seattle for ten years.
1941	In the lead-up to World War II cargo vessels of all types came to be in great demand. The U. S. Army purchased the <i>C. A. Thayer</i> in 1941 to serve as an ammunition transport barge on British Columbian and southern Alaskan waters. The vessel was substantially altered in order to be used for this purpose including reinforcing the hull, removing the masts, and enlarging the hatches, among other changes.
1941-1946	<i>C. A. Thayer</i> owned by the U. S. Army and used as an ammunition transport barge on British Columbian and southern Alaskan waters. During these years the vessel was identified as "Barge <i>C. A. Thayer</i> ."
1943	Karl C. Kortum, mariner and sailing ship enthusiast, began to muster public support for the establishment of a museum in San Francisco dedicated to the maritime history of the Pacific.
Spring 1946	John E. Shields purchases the <i>C. A. Thayer</i> from the U. S. Army for several thousand dollars and uses elements of other ships to make necessary changes in order to return the <i>Thayer</i> to sea again as a codfishing vessel.
1946-1950	<i>C. A. Thayer</i> operates five more seasons as a codfishing vessel for Pacific Coast Codfish Company.
1950	In her last season at sea, the <i>C. A. Thayer</i> was the last operating sail-powered commercial vessel on the Pacific Coast.
1950-1954	John E. Shields keeps <i>C. A. Thayer</i> laid up in the freshwater port of Lake Union, Seattle.
May 1951	San Francisco Maritime Museum opens to the public on May 27, 1951.

Chronology of Development and Use

October 1954	John E. Shields sells <i>C. A. Thayer</i> to Charles McNeal of North Lilliwaup, Washington.
1955-1957	Charles McNeal exhibits the <i>C. A. Thayer</i> to the public as the pirate ship <i>Black Shield</i> , beached on a gravel bar in a lagoon on his property on the Hood Canal, Washington, among other tourist attractions he maintains.
1955-1957	Purchase negotiations are ongoing between Charles McNeal and the San Francisco Maritime Museum, supported by funding from the State of California, to purchase the <i>C. A. Thayer</i> .
1957	California state park unit named San Francisco Maritime State Historic Park established to display historic ships at Hyde Street Pier.
June 17, 1957	State of California purchases <i>C. A. Thayer</i> from Charles McNeal for \$25,450 for the San Francisco Maritime State Historic Park.
1957-1977	<i>C. A. Thayer</i> owned by State of California.
May-October 1957	<i>C. A. Thayer</i> extensively repaired and refitted at Lake Union Drydocks to serve as a museum vessel.
October 1957	<i>C. A. Thayer</i> completes last sail down the Pacific Coast as the vessel is moved from Lake Union to San Francisco Bay. Last leg of the journey is completed under tow by a Coast Guard Cutter.
1958-1963	<i>C. A. Thayer</i> hauled out over several seasons to different shipyards in Oakland and Alameda for ongoing repairs and alterations.
October 1963	<i>C. A. Thayer</i> opens to the public at the San Francisco Maritime State Historic Park at Hyde Street Pier in San Francisco on October 2, 1963. Other vessels on display included the steam schooner <i>Wapama</i> , the scow schooner <i>Alma</i> , and the ferryboat <i>Eureka</i> . Interpretive information for the <i>C. A. Thayer</i> was developed by staff of the San Francisco Maritime Museum.
1963-1979	A haul-out and maintenance and restoration schedule is developed for the <i>C. A. Thayer</i> with work occurring approximately every 3-4 years, although the State of California struggled to provide the necessary money and manpower for the ship's demanding needs.
November 1966	<i>C. A. Thayer</i> designated a National Historic Landmark on November 13, 1966.
1977	The San Francisco Maritime State Historic Park and all of its ships including the <i>C. A. Thayer</i> come under management of the Golden Gate National Recreation Area, a newly established national park.

Chronology of Development and Use

1977-present	<i>C. A. Thayer</i> is owned and overseen by the National Park Service. The vessel is visited by an average of 200,000 persons a year including school children taking part in overnight programs run by the National Park Service's non-profit partner the San Francisco Maritime National Park Association.
1977-1998	Ongoing semi-regular haul-outs for both routine and emergency repair, maintenance and restoration. Seven surveys and preservation assessments over the course of this period of time document progressive and increasing deterioration of the <i>Thayer's</i> hull, with rot, damage from marine borers, and hog in the keel reported as the vessels' leading challenges.
September 1979	<i>C. A. Thayer</i> listed on the National Register of Historic Places Inventory on September 20, 1979.
1983	<i>C. A. Thayer</i> oversight transferred to Maritime Unit of the Golden Gate National Recreation Area.
June 1988	San Francisco Maritime National Historical Park becomes a separate administrative unit of the National Park Service.
1989-2002	Ongoing discussions of appropriate approach to preservation of the <i>Thayer</i> . A 1989 preservation workshop advocated for maximum retention of existing historic material in order to protect the historic integrity of the resource. A 1991 conditions assessment considered four scenarios ranging from loss of the vessel to extensive restoration with in-kind replacement of deteriorated materials. A 1991 preservation committee meeting advanced the idea that ships in their active lives were subject to ongoing repair, and that ongoing restoration of the <i>Thayer</i> could therefore replace historic materials in-kind without suffering a loss of integrity. These findings were restated in a planning document issued by the National Park Service in 1999, and further advanced in a 2002 environmental assessment document issued by the National Park Service for the rehabilitation of the <i>Thayer</i> .
2003-2007	<i>C. A. Thayer</i> hull restored in a multi-year effort.
2008	Rehabilitation work on the structural elements of afterhouse is begun, necessitating documentation and removal of afterhouse exterior.
2011	San Francisco Maritime National Historical Park acquired components of the <i>Wawona</i> , the only other surviving West Coast lumber schooner, which was dismantled by its owners in 2009.
2012	Additional hull restoration work completed.
2014	Skylight atop the afterhouse was restored.
2015-2019	<i>C. A. Thayer</i> rigging restored in a multi-year effort.

Chronology of Development and Use

2019	Additional restoration work began to complete the afterhouse.
2020-present	Cyclical hull maintenance and continued restoration of the <i>Thayer</i> , including redesign and construction of the foreword deckhouse.

CHRONOLOGY OF PHYSICAL CONSTRUCTION

This table lists substantial changes to the physical material of the *C. A. Thayer*.

July 8, 1895	<i>C. A. Thayer</i> launched from the Fairhaven shipyard of H. D. Bendixsen.
c. 1903	Original donkey engine, installed at construction and provided by Humboldt Iron Works, removed by this year.
November 1903	<p>Under command of Captain Ole Monsen, <i>C. A. Thayer</i> went ashore on the North Spit of Grays Harbor, Washington, on November 8, 1903, and was refloated on December 2, 1903 with damage limited to loss of rudder, rudderpost, and both anchors.</p> <p>A photograph taken at the time of the vessel's stranding show details of what is presumed to be her original configuration. She is seen as a three-mast schooner with masts of equal height. Above the upper mast bands, to which triatic stays are fixed, "pole" topmasts taper to a round truck onto which small topsails are bent with hoops. Her masts are not cut square at the cap, indicating she was not designed to carry topmasts. She is rigged with deadeyes and lanyards on the standing rigging. She has a spike bowsprit. Also visible are raised pinrails on the shrouds, a modification demanded by the practice of carrying great deckloads of lumber. For the same reason, the deck lacked permanent obstructions such as foot blocks, bitts, deck pumps, etc.</p>
1904	<i>Thayer</i> is reported to have lost her jib and main sail in a gale, likely not an uncommon occurrence based on sailor's journals and later photographs showing similar damage.
1912	<p>On January 14, 1912, the <i>C. A. Thayer</i> radioed for assistance while leaking badly and in immediate danger of sinking about 20 miles off the Humboldt Bar, the first time the presence of a radio is noted on the ship. The <i>Thayer</i> was leaking badly despite continual pumping: the donkey engine had been reinstalled but was not usable due to limited fresh water, and hand pumps had clogged. The ship was at sea in this condition for 11 days when she was rescued by steamer <i>J. B. Stetson</i> and towed to San Francisco Bay.</p> <p>Owners of the <i>Stetson</i> filed a \$9,000 salvage claim on the <i>Thayer</i>. E. K. Wood Co. opted not to pay this claim or complete necessary repairs to the <i>Thayer</i>, and instead laid the ship up in Oakland.</p>
1912	Peter M. Nelson, purchased <i>C. A. Thayer</i> from the E. K. Wood Co. for about \$10,000, for use in his salmon saltery operations at Bristol Bay, Alaska. The vessel undergoes few modifications for its new trade, and indeed remains able to transport lumber, as it returned to that task for several voyages during World War I.

Chronology of Development and Use

1918-1919	<p>On her way to Australia the <i>Thayer</i> suffered damage to the rig and sails, and on the return journey leaked badly.</p> <p>A photograph from this era shows the vessel with a West Coast-style square foresail set on its yard on the foremast. This was a two-part sail which brailed into the mast, rather than up to the yard, so that the weather half, which would not be blanketed by the large gaff foresail, could be set alone.</p>
February 1925	<p>Captain John E. Shields, principal owner of Pacific Coast Codfish Company of Poulsbo, Washington, arranges to buy the <i>C. A. Thayer</i> while the vessel is in drydock in Oakland. Shields repaired and refitted the vessel for codfishing use and departed San Francisco Bay for Puget Sound, Washington in early March 1925.</p>
1925-1931	<p>The change to codfishing necessitated a number of alterations to the <i>Thayer</i> which are estimated to have occurred between 1925 and 1931, including:</p> <ul style="list-style-type: none">• Additional bunks built for fishermen, amidships in the berthing area or “fisherman’s forecastle” at the forward portion of the hold;• Deckhouse extended forward to the break of the forecastle head and widened on the starboard side to provide a companionway into the galley, the crew dining area, and the fisherman’s forecastle;• 100-gallon drums were mounted to the main deck to provide a supply fresh water for extended periods at sea;• The size of the fore hatch opening was reduced;• The donkey engine was moved forward with the gypsy head mounted on the deckhouse roof, forward of the mast; and• In addition to the traditional stern davits of her original equipment, six pairs of steel davits were fitted along the caprail, port, and starboard, to handle the fishermen’s dories. These dories, originally the traditional two-man sail and oar powered type that nested on the deck, were replaced c. 1927 by larger one-man boats powered by small outboard motors and protected by canvas dodgers. Large gasoline tanks were mounted in the hold to fuel the dories.
1941	<p>The U. S. Army purchased the <i>C. A. Thayer</i> in 1941 to serve as an ammunition transport barge on British Columbian and southern Alaskan waters. The vessel was substantially altered in order to be used for this purpose including:</p> <ul style="list-style-type: none">• Masts removed;• Hull reinforced, with maximum hog described as 6 inches; and• Fore and main hatches lengthened, likely during this time although no confirming historical documentation has been found, so that the main hatch, which originally measured 15 feet fore and aft, was lengthened by cutting through the deck beam at the aft end of the hatch and installing longer carlings, extending the hatch aft by four feet, and the fore hatch was similarly lengthened by extending it forward by eight feet six inches.
1946	<p>John E. Shields purchases the <i>C. A. Thayer</i> from the U. S. Army for several thousand dollars and uses elements of other ships to make necessary changes in order to return the <i>Thayer</i> to sea again as a codfishing vessel, including:</p>

Chronology of Development and Use

	<ul style="list-style-type: none"> • Three masts, standing rigging, and headgear from <i>Sophie Christenson</i> installed; • Shrouds extended to reach chainplates with double steel straps bolted into place; • Deadeyes and lanyards replaced with open turnbuckles; • Original tapering topmasts gone (replaced by topmasts from <i>Sophie Christenson</i>), and gaff-headed mizzen sail replaced with smaller, easier to handle jib-headed or leg-of-mutton sail; • Wheelhouse built over steering station; and • Spike bowsprit replaced by bowsprit-and-jibboom arrangement.
1954-1957	<i>C. A. Thayer</i> is beached on a gravel bar in a lagoon on the Hood Canal, Washington, and some deck components are altered so the ship can be exhibited to the public.
May-October 1957	<p>Work completed in order to sail the <i>C. A. Thayer</i> to the San Francisco Bay completed in Lake Union Drydocks, including;</p> <ul style="list-style-type: none"> • At the hull: forecastle sheer strake replaced at the port side, two bottom planks replaced at the starboard side, the keel repaired from the forefoot to 30 feet aft, 3,600 feet of seams recaulked, topsides sandwashed and painted, and bottom painted; • At the stern: one new frame and three sister frames installed at port and starboard quarters, six new frames and four sister frames installed in the transom, one deck beam removed and a sister beam installed, deteriorated ends of additional deck beams cut off and steel angle supports installed, “horseshoe” timbers replaced along with covering board, bull rail, and caprail around stern, 119 feet of transom planking replaced, 136 feet of starboard quarter planking replaced, 66 feet of port quarter planking replaced, and new bitts installed at starboard quarter; • At the forecastle head: bull rails and portions of rotting covering boards renewed, catheads and pawl bitts renewed, deck beam at the break of the forecastle and sister beam forward of pawl bitt renewed, decking in way of pawl bitt renewed; • Anchor windlass support timbers renewed; • Anchor windlass and gasoline donkey engine returned to working order; • Rerigging: new masts and bowsprit provided by the Spar Manufacturing Company of Seattle, old booms and gaffs retained, sails salvaged from the codfishing schooner <i>Charles W. Wilson</i>, spanker sheet horse taken from schooner <i>Beulah</i>, masts stepped and new rigging installed under supervision of master rigger Jack Dickerhoff, original spike bowsprit and “bald headed” type masts replicated, mizzen sail retained in the jib-headed configuration without mizzen gaff, square foresail not reinstated, turnbuckles rather than deadeyes and lanyards installed; • Wheelhouse installed during codfishing era removed and original steering box reconstructed, with brass wheel installed during later codfishing period removed and replaced by cast iron wheel from the schooner <i>Azalea</i>.
August 1958	Haul-out and bottom work completed at Moore Dry Dock Company in Oakland, California; large steel gasoline and water tanks removed from the hold and replaced by wooden tanks from the schooner <i>Beulah</i> ; continued unspecified research, restoration, and interpretation work in preparation for public exhibition.

Chronology of Development and Use

1959	Haul-out and bottom work completed at Martinolich Ship Repair Company in Alameda, California; bottom cleaned and painted, draft numbers painted, and 25 feet of keel shoe replaced.
1960	Plans for restoration of the aft cabin developed over the course of conversations with Captain Ole Lee, who sailed and/or captained the <i>Thayer</i> c. 1915-1919. Restoration efforts returned the aft cabin to its original configuration with exception of extension of the passageway through what had been the Chief Mate's quarters through to the after companionway, in order to facilitate visitor circulation. This restoration reflects the current configuration of the aft cabin in 2020.
1961	Haul-out and bottom work completed, including routine cleaning and painting, replacement of 50 feet of keel shoe, and repair of mizzen crane iron.
October 1963	As the <i>C. A. Thayer</i> is opened to the public at the San Francisco Maritime State Historical Park at Hyde Street Pier, interpretive captions and labels are in place on the vessel, developed by the San Francisco Maritime Museum.
1969	While in drydock at the Pacific Drydock and Repair Company, the "whole stern is opened up," extensive planking is removed, and cant frame is renewed in bows.
1972	While in drydock at Merritt Ship Repair Company, hog at the keel is measured at 9-5/8 inches; some bottom planking renewed and windlass brake repaired.
1975	While in drydock at Merritt Ship Repair Company, 367 linear feet of hull planking is replaced, keel shoe renewed, forward deck house roof renewed, new galley stove and flue installed, portions of stern bull rail, caprail, and covering board renewed.
December 1978	<i>C. A. Thayer</i> is reported to have been taking on water at a rate of 36,000 gallons over a six-day period, and emergency haul out requested.
January 1979	During emergency drydock Merritt Ship Repair Company, 150 feet of hull planking replaced, 400 feet of seams recaulked, 102 feet of keel shoe replaced, protective sheathing of pressure treated Chemonite plywood over Irish felt was applied to the entire underwater surface.
1980	A survey conducted while the vessel was in drydock at Merritt Ship Repair Company noted 14 inches of hog at the keel, as well as extensive rot at the deck and upper frames, and at deck beam ends and covering boards, and worm damage at previous repairs.
1981	Mizzen mast removed as a safety precaution after extensive rot discovered during routine scraping. Inspection revealed extensive rot at the fore and main masts as well; new masts ordered from Intermountain Orient Co. of Boise, Idaho.
January 1981	Storm parts the stern offshore anchor chain and causes damage to 20 square feet of hull planks on the starboard side at five feet above the waterline.

Chronology of Development and Use

1982	Winter storm parts the bow anchor chain and stove in eight planks amidship.
Fall 1982- January 1984	Drydock repair at Pacific Drydock and Repair Company, including 600 linear feet of four inch thick pressure treated planking, varying in width from four to 10 inches, installed to replace storm-damaged and rotten topside planking on the starboard side, at the quarter and amidship; fore and main masts removed; masts replaced with new spars from Intermountain Orient Co.; existing rigging installed on new spars, along with new hemp lanyards; bowsprit replaced after rot-related break.
1987	<p>Responding to deterioration noted in a 1984 survey, work was completed on the topsides, main deck, and bulwarks. Work performed under contract with Richardson Bay Boatworks and Ways included:</p> <ul style="list-style-type: none"> • Refastening 23 sprung topside plank butts; • Replacement of 66 linear feet of topside planking at port side; • Recaulking of selected seams, with seams at port and starboard topsides treated with Hydroseal (a bitumastic sealant); • Port and starboard topsides painted black; • Deteriorated bulwark stanchions repaired and replaced (repairs used cement and dutchmen, while replacement stanchions were non-structural); and • Bolster installed on the starboard quarter for shifting the stern mooring line to reduce hogging strain. <p>Work performed by the NPS included;</p> <ul style="list-style-type: none"> • Replacement of two starboard forward rotten deck planks; • Recaulking of select deck seams; and • Paying all seams with marine glue (pitch).
August 1988	<i>C. A. Thayer</i> began to take on water at a dramatically increased rate and an emergency haul-out was planned for 1989.
January 1989	<p><i>C. A. Thayer</i> hauled out at Pacific Drydock and Repair Company and repaired, including</p> <ul style="list-style-type: none"> • Renewal of 65 linear feet of worm-damaged and rotten planking at and just below the waterline at the starboard side, amidship; • Removal of rudder and steering gear; removal of all plywood sheathing along the waterline and ten additional sheets of plywood at various locations on the bottom; • Extensively deteriorated outer “sacrificial” worm shoe removed, copper sheathing applied to remaining worm show and keel; and • Relocation of sea suction thru-hull fitting from starboard to port side, new fitting and sea cock installed. <p>The keel was measured prior to haul-out and 14 1/4-inch hog was observed.</p>
1989	New lathe-turned Douglas fir spar outfitted with fittings and jaws from the old boom and installed.
1991	Conditions assessment finds that the <i>C. A. Thayer</i> is in an advanced state of deterioration and will require major structural repairs.
1997	Mainmast removed due to rot.

Chronology of Development and Use

- 2003-2007 Multi-year restoration effort of the *Thayer's* hull conducted by Bay Ship and Yacht in Alameda included the following actions:
- Two remaining masts, bowsprit, capstan, anchor windlass, anchors, and anchor chains removed;
 - Fisherman's forecastle dismantled and removed to museum storage except for its deck
 - Forward-most six feet of the forward deckhouse, determined to be original, removed and stored, while remainder of forward deckhouse, dating from the 1940s, demolished;
 - Hull laser scanned;
 - Deck planking, bulwarks, and topside planking removed, and fastening pattern of the trunnels on the few remaining original planks noted in order to replicate when new planking was reinstalled;
 - 80- to 90-foot length old-growth timber bottom planking found to be generally free of rot and retained;
 - Ceiling planking below the turn of the bilge removed and replaced;
 - Forward 40 feet of 4-inch thick wormshoe replaced;
 - Futtocks removed, and new futtocks built using method of individual patterning and shaping for exact replication of replacement futtocks;
 - Upper sister keelsons and keelsons removed;
 - Stern reconstructed including new upper section of the stern post, new rudder trunk, strong quarter knees, and full ceiling planking installed to reinforce upper aft section of the bulwarks;
 - Transom, which was shortened six inches in the 1940s, restored to original design;
 - 48 original hanging knees repaired with old-growth Douglas fir where necessary; two hanging knees shaped new. Each knee was treated with 20% borate salt solution to protect against rot. Old fastening holes infilled with dowels and new holes were drilled for new fasteners;
 - Diagonal point timbers at bow and stern removed for eventual replacement;
 - Renewal of thick ceiling planking in kind with 80-foot lengths of 8-inch fir through the middle of the hull, and double layers of 4-inch thick plank, following the original design, at the fore and aft sections. Pattern and amount of fastening was also reproduced;
 - Sheer clamp timbers, which originally used single timbers that were 114 feet long and 14 x 12 inches in section, replaced with 42-foot length timbers scarf jointed together;
 - Hull planking replaced with four-inch thick fir, based on documentation of original layout (both planking and fasteners), but with adjustments made to suit the widths of the replacement material, using 80-foot planking in many areas;
 - Deck beams replaced except for main deck nos. 1 and 2 and nos. 35-41 under the afterhouse, and forecastle deck nos. 1-7. Deck camber determined to be inconsistent: new camber of 3.5 inches selected and sawn into the top surface of each beam, replicating the technique at original construction;
 - 17 original hold iron stanchion brackets retained, rehabilitated and reused, and nine replica brackets fabricated and installed;
 - Cargo hatches returned to original sizes, spanning four deck beams each;

Chronology of Development and Use

- Original waterway timbers, up to 80 feet in length, removed and replaced with smaller lengths scarf jointed together. Waterway timbers were sawn into shape from wider stock, based on original construction techniques to maximize strength, and notched to fit over the ends of deck beams and into bulwark stanchions;
- Deck planking restored using 4 x 4-inch Douglas fir planks in 40 foot lengths, with a bevel planed into one edge to accommodate caulking;
- Deck and hull planking caulked using traditional working techniques and materials. All seams filled with cotton and oakum, topside seams finished with a tar-like seam compound; seams below the waterline finished with Portland cement; seams in the deck finished with marine glue;
- Hull and bulwarks painted by hand with roller and brush to simulate authentic look and texture;
- Afterhouse moved in order to allow for hull access; interior paneling and fittings dismantled and stored; new starboard ends scarfed onto three rotten beams under the afterhouse, and original deck planks inside the afterhouse preserved; and
- Bulwark planking and rail cap installed under separate funding sources.

2008	Rehabilitation work on the exterior of the afterhouse is begun; scope of work unknown.
2011	<p>San Francisco Maritime National Historical Park acquired components of the <i>Wawona</i>, the only other surviving West Coast lumber schooner, which was dismantled by its owners in 2009. Components acquired to replace missing or damaged equipment on the <i>Thayer</i> included:</p> <ul style="list-style-type: none"> • Rudder head clamp fitting; • Steering gear; • Port and starboard bilge pumps and one pump handle; • Bronze port light from forward deckhouse (to be used as a pattern for fabrication of new lights); • Windlass crosshead (did not match <i>Thayer</i> and was not used); • Galley fresh water hand pump; and • Rigging components and sail fragments acquired to inform fabrication of new components, including block, sheet bails, boom end goosenecks, spar bands (hinged and unhinged), stay bails, sail hanks, parrel beads, shackles, spectacle irons, sail corner ring and thimbles, and sister hooks.
2012	<p>Additional hull restoration work completed at Bay Ship and Yacht in Alameda including:</p> <ul style="list-style-type: none"> • Fabricating, fitting and installing missing sections of the lower sister keelsons and upper sister keelsons inside the hull; • Dubbing and fairing the futtocks in way of the thin ceiling; • Fabricating, fitting, and installing missing areas of the thin ceiling: ship plank-grade Douglas fir was not available from any supplier and select structural, free of heart center-grade Douglas fir used instead; • Fabricating, fitting and installing pointers, four at the bow and two at the stern. The original #1 port and starboard pointers and the breasthook knee for those pointers were retained in 2007 to be used as patterns for accurate replacements. However, a 2011 inspection determined these components were sound, and they were reinstalled;

Chronology of Development and Use

- Horsing (caulking) the poop, main, and forecastle decks;
- Drydocking the ship for hull cleaning and painting;
- Repairing hull planks as needed;
- Reefing and Recaulking hull seams and butts as needed;
- Rudder blank created by park staff, shaped, fitted, coated, and installed by Bay Ship and Yacht; and
- Original deteriorated steering gear removed and placed in museum storage; *Wawona* steering gear installed and new steering-gear box fabricated and installed over the gear on the poop deck.

2014	Skylight atop the afterhouse was restored by shipwright Jeffrey Vallely.
2015-2019	<p>Multi-year restoration effort of the <i>Thayer's</i> rigging conducted by Bay Ship and Yacht in Alameda and park staff at Hyde Street Pier included the following actions:</p> <ul style="list-style-type: none"> • Fabrication of laminated masts, spars, and associated ironwork; • New mast trucks and parrel beads fabricated from lignum vitae due to unavailability of ironbark as historically used; • Hull cleaning and antifouling painting; • Some areas of the underwater hull planks, aft deadwood, rudder, and aft wormshoe replaced after damage from marine borers discovered; • New bull rails, bull rail cap, stanchions, and taffrail installed around the poop deck; • Anchor lining planks added to the bulwarks on either side of the bow; • New chain plates fabricated and installed athwart the mast locations; • New catheads installed; • Gammoning knee, including fiddlehead, fabricated, carved, painted and installed; • New bowsprit stepped; • New masts stepped following preparatory work including cutting mast step for the foremast and repairing the mast steps for the main and mizzen masts, and cutting circular openings through the deck planking to allow for all three masts to pass; • New pin rails installed along the bulwarks and the shrouds partly set up; • At Hyde Street Pier, park staff rigged the gaffs and booms with peak halliards, throat halliards, and sheets; spliced the deadeyes to the shrouds on all three masts and served the lower sections of the shrouds; rigged the headsails to the stays along with the required running rigging; applied slush and tar to all rigging as a preservative measure following historic practice; and fabricated and installed canvas mastboots to cover masts where they pass down through the deck; • Staysail boom topping lift rerigged based on new analysis of historic photos; • Davits rigged and painted; • Blocks removed, dismantled, and soaked in a mixture of tar and linseed oil (performed annually); • Spars slushed in a mixture of tar and linseed oil (performed annually); and • Service received two coats of Stockholm tar (performed annually).
2019	Additional restoration work began to complete the afterhouse including installation of the windows and slide shutters and reinstallation of the interior paneling.

Chronology of Development and Use

- 2020-2021 Beginning of the last phase of restoration of the *Thayer*, including:
- Maintenance of the hull including hull planking and worm shoe repairs, cleaning, and painting;
 - Restoration of hatch covers for the lumber port openings through the transom;
 - Reconstruction of lumber loading platform in the hold aft;
 - Reconstruction of chain locker at bow in hold;
 - Repair and replacement of areas of the bull rail;
 - Installation of about 25 feet of new salt box in the hold;
 - Replacement of the end grain with graving pieces where the transoms beams have deteriorated;
 - Painting of the steering wheel and steering-gear box;
 - Carving of name, home port, and decorative scroll on transom; and
 - Restoration and reinstallation of the windlass.
 -
- Remaining work to be done by SAFR shipwrights includes:
- Fabrication of louvered ventilation hatches for alternative use in the chute openings;
 - Ongoing investigation into appropriate (if any) style and location of draft marks for potential replication;
 - Restoration of the forward deckhouse to original footprint and approximately historical internal layout including four compartments including a forecastle with six berths forward, a galley and cook's room in the middle, and a donkey engine room aft; and
 - Restoration and reinstallation of the galley stove.
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Section Five

Physical Description

SPECIFICATIONS

Length	156'
Beam	36' 8"
Depth	11' 6"
Gross Tonnage	452
Net Tonnage	391 ¹

GENERAL ARRANGEMENT

The *C. A. Thayer* is a three-masted schooner with a single deck and an undivided hold. The vessel was constructed in 1895 for the E. K. Wood Lumber Company to transport lumber between their mill in Hoquiam, Washington and their San Francisco lumberyard. The ship later served the salmon and codfishing industries and briefly operated as a transport barge for the U. S. Army and as a “pirate ship” at a roadside tourist attraction. Since 1963 the *Thayer* has been exhibited to the public at Hyde Street Pier in San Francisco, owned and managed first by the State of California, and, after 1977, the National Park Service. The *C. A. Thayer* underwent a variety of alterations in her first 100 years in service; since the mid-1990s an extensive restoration program has largely returned the vessel to her original arrangement and appearance. Three major phases of restoration work include hull restoration in 2003-2007, rig restoration in 2015-2019, and deckhouse and additional remaining restoration tasks in 2019-2020. The following physical description presents the present general arrangement of the *C. A. Thayer*’s material features, with information about prior alterations and restoration of features where applicable.

The deck of the *Thayer* was originally designed to hold nearly half of the ship’s 740-ton cargo capacity and is largely uninterrupted. All decking was historically Douglas fir and has been replaced in kind with new Douglas fir, matching where possible the lengths originally used, and caulked with cotton, oakum and tar using historically accurate working techniques. The entire deck from the bow to the forward face of the aft cabin is enclosed by heavy bulwarks which have also been replaced in kind.

At the bow, a forecastle head deck includes a capstan, two catheads, a staysail boom tabernacle, sampson post, two bitts, and several cleats. The area of the main deck below the forecastle head deck shelters the anchor windlass, the base of the bowsprit, openings for the anchor chain, and several bitts and cleats.

Directly aft of the forecastle head deck at the main deck is the forward deckhouse. The forward deckhouse was altered significantly in the 1940s, with its footprint expanded to the forecastle head deck, and the only remaining original material was at the forward-most six feet. The forward deckhouse is undergoing reconstruction in 2020-2021 to reflect its approximated original footprint, configuration, and appearance. The reconstructed forward deckhouse has a rectangular footprint and is clad in horizontal tongue and groove wood siding and capped with a generally flat deck. There are several small ports (window openings) at the port and starboard facades and doors at the fore and aft facades. The forward deckhouse will be partitioned into four compartments including a forecastle with six berths forward; a galley and cook’s room in the middle; and a donkey engine room aft. Construction details for the forward deckhouse’s structure and cladding are

¹ National Park Service, np.

Physical Description

extrapolated from the surviving original six-foot section, historic photos, and the original Bendixsen plans in the collection of other lumber schooners and The Historic American Merchant Marine Survey. New materials reflect historic materials in kind. A small hatch forward of the deckhouse has been decked over. The foremast is located within the forward compartment of the forward deckhouse.

Aft of the forward deckhouse is the forward hatch. The original size of the forward hatch was expanded aftward by the width of two deck beams, likely in the 1940s when the ship was used as a transport barge. The forward hatch has been restored to its original size, now spanning four deck beams. It is currently covered by a wood enclosure that is open at its port side. A straight wooden stair with a metal handrail was installed in the 1960s for public visitation and allows passage from the main deck to the hold. The mainmast and associated cleats are located just aft of the forward hatch.

Midway between the mainmast and the mizzenmast is the main hatch. Similar to the forward hatch, the main hatch was expanded aftward by the width of two deck beams, likely in the 1940s, and has been restored to its original size, now spanning four deck beams. It is currently covered by an open wood grate. The mizzenmast and associated cleats and ring bolts are located aft of the main hatch.

The after cabin (or aft cabin or afterhouse) is located at the aft section of the main deck. The aft cabin has a generally square footprint that spans the majority of the width of the deck and is clad in horizontal tongue and groove wood cladding and capped with a generally flat deck with a centrally-located rectangular monitor skylight composed of three-lite wood awning windows. The after cabin includes a double entry door and two windows with sliding wood shutters at its fore façade and three windows with sliding wood shutters at its port and starboard façades. A companionway at the aft façade connects the interior of the after cabin to the poop deck.

The interior of the after cabin had been reconfigured several times over the course of the vessel's history. As currently configured, the entry door is located slightly portside and accesses a corridor that extends straight through the after cabin to the companionway. Off the corridor to port are small rooms and bunks, including what was historically the bath/head, and to starboard are larger rooms and bunks that served as the saloon and captain's quarters. Interior walls are painted vertical board and batten at the corridor and smaller rooms and paneled at the larger rooms; panels at larger rooms are redwood faux finished to look like hardwood and have scrolled wood ventilation panels at their upper perimeter. Raised thresholds are covered by metal sheathing ornamented by an embossed star. The interior of the after cabin is currently undergoing restoration and some rooms and spaces are in an unfinished condition.

The poop deck begins at the forward bulkhead of the after cabin and continues to the perimeter of the stern. The poop deck is accessed by short straight stairs port and starboard of the after cabin, and by the companionway. The wheel, steering gear, and steering gear box are located at the center of the poop deck. The *Thayer's* original steering wheel and gear were too deteriorated to restore to working condition. The wheel was replaced in 1957 with the wheel of the lumber schooner *Azalea*, and the gear was replaced in 2012 by steering gear from the schooner *Wawona*. Additional features of the poop deck include a hatch to the lazarette, four bitts, and a cleat and sheet horse associated with the mizzenmast.

The hold of the *Thayer* was originally designed to hold more than half of the ship's 740-ton cargo capacity and is largely undivided. A chain locker at the foremost portion of the hold houses the anchor chains and may be used for incidental storage. A fisherman's forecastle installed in the hold directly aft of the chain locker during the vessel's salmon and codfishing era included approximately 24 berths, seats, storage, stanchions, and a stove; the fisherman's forecastle was removed in the 2003-2007 period of reconstruction and placed into museum storage. A

Physical Description

false sole in the hold which was installed during the codfishing era has been removed and will not be reinstalled.

In the aftmost portion of the stern of the hold, two lumber chutes flank the rudder trunk. The chutes are accessed via external ports at the transom and let onto a built knee to function as a breasthook towards the aft of the hold.

The remainder of the hold is undivided space organized around the keelsons and stanchions at the centerline of the ship and the hanging knees that provide support at the junction of the deck beams and the hull. Of the ship's 50 original knees, 48 were repaired and reinstalled and two were shaped new. The thick (8") ceiling (cladding material in the hold) was replaced in kind during the 2003-2007 period of reconstruction and fastened with a variety of steel fasteners. Trunnels fasten the planking.

The hull of the *C. A. Thayer* was routinely repaired over the course of its lumber, salmon, and codfishing eras, but its appearance remained largely unaltered other than the installation of fish handling ports through the midship bulwarks. When acquired by the state of California, minor changes were made to the hull including installation of hawse pipes at the poop deck bulwark for mooring at Hyde Street Pier. During the first several decades of state and federal management, the hull was intermittently repaired but experienced progressive and increasing deterioration. As a result of the comprehensive restoration effort undertaken between 2003 and 2007 using in-kind materials and historic working techniques, the hull is largely new construction but reflects the appearance of the ship at its original construction.

The hull is carvel planked with scarf joints and trunnel fastenings. The keel, lower futtocks, and 80- to 90-foot bottom planking are original, while upper futtocks and planking have been replaced in-kind. New futtocks were patterned and shaped directly from the hull to ensure accurate reproduction. New planking is four-inch-thick Douglas fir: although the layout and original fastening pattern of the planking was documented

for recreation, the planking runs needed to be adjusted due to the widths of the replacement materials. Most replacement planks are 80-foot lengths that were steam-bent at the ends of the hull. Anchor lining planks are located at the bulwarks of the bow at both port and starboard. The bulwarks and the portion of the hull above the waterline are hand-painted black, while the portion of the hull below the waterline is hand-painted red.

The stern was significantly deteriorated, and all internal and external components have been replaced in kind, including the upper section of the stern post, rudder trunk, and internal members including the quarter knees and ceiling planking. The rudder is articulated and was fabricated and installed in 2012 to match the material and appearance of the historic rudder. The transom was altered in the 1940s and returned to its original appearance during restoration between 2003 and 2007. The transom includes two rectangular lumber port doors and is engraved with the name of the ship and its home port to read, "*C. A. Thayer* San Francisco," separated by a small engraved floral swag.

The *C. A. Thayer* was rigged at construction as a three-masted, "bald-headed" (lacking topmasts) schooner. The rigging was altered many times over the course of the vessel's historic working life, culminating in the removal of the masts, spars, and bowsprit when she was used as a transport barge during World War II. The *Thayer* was rerigged between 2015 and 2019 to specifications developed using historic photographs of the vessel, historic documents that described her rigging, and secondary sources including construction drawings of other Bendixen-built schooners and construction contracts from other lumber schooners.

The three masts of the *Thayer* are 106 feet in height. All three masts are "built" (laminated) of Douglas fir. Sentinel Structures constructed the laminated beams, and Bay Ship and Yacht shaped the masts in 2016. The process of shaping included laying out the taper and sawing and planing the beam to eight sides, then 16 sides, then 32 sides,

Physical Description

then sanding smooth to result in a round spar. The spars (gaffs, booms, and bowsprit) were also fabricated and installed during this time. Masts and spars are tapered to match their historic dimensions and profile. Some components of the masts and rigging that were historically ironbark (hard wood) were replaced with different wood because iron bark was not available. Purple heart was used for the gaff and boom jaws and for parts of the trestle and trees. Lignum vitae was used for the deadeyes, hearts, trucks, and parrel beads.

Park staff completed rerigging while the *Thayer* was at Hyde Street Pier. The course of this work included rigging the gaffs and booms with peak halliards, throat halliards, and sheets; splicing the deadeyes to the shrouds on all three masts and serving the lower sections of the shrouds; rigging the headsails to the stays along with the required running rigging; applying slush and tar to all rigging as a preservative measure following historic practice; and fabricating and installing canvas mastboots to cover masts where they pass down through the deck. The staysail boom topping lift was also rerigged based on new analysis of historic photos in 2019. The gammoning knee, fiddlehead, and bowsprit are hand-painted black, with yellow paint at the decorative scrolled carving at the fiddlehead.

Section Six

Evaluation of Significance

EVALUATION

The historical significance of the *C. A. Thayer* was recognized in 1966 when the structure was listed as a National Historic Landmark and subsequently placed on the National Register of Historic Places. James P. Delgado and Gordon S. Chappell, historians of the National Park Service - Western Division, developed a thorough evaluation of the vessel's historical significance in 1979 as part of an updated nomination to the National Register of Historic Places. The *Thayer* was found to be significant in the areas of industry and commerce. The statement of significance developed in the 1979 National Register nomination reads:

The *C. A. Thayer* is the last surviving example afloat of 122 sailing schooners especially designed for use in the 19th century Pacific Coast lumber trade. For many years the only practicable way to ship the lumber products of the northern California redwood forests was by sea, and most of the sawmills were built on or very near the coast. Fogs, strong winds, rocks, and powerful currents plagued the navigator, and most shipping points were mere "dog-holes," slight indentations in a rocky coast, where ships had to anchor close to the shore and load by chutes, lighters, or cables. These conditions quickly gave rise to a fleet of small sailing schooners that did yeoman sailing service in the redwood lumber trade until gradually replaced by the steam schooner.

Typical of these Pacific Coast sail lumber schooners is the *C. A. Thayer*.¹

Contemporaneous analysis by National Park Service reviewer Joe Townsend also noted that, "At the time of construction, the *Thayer* represented a new standard in size and sailing design, which permitted her to make trips across the Pacific as well as along the mainland coast."²

The *C. A. Thayer* remains historically significant for the reasons developed in the 1979 National Register nomination; however, architecture should be added to its existing significance in the areas of industry and commerce. Using a contemporary rubric for the evaluation of historic significance established by the National Park Service in the 1990s, the vessel is historically significant under National Register Criterion A (Event) because it is associated with events that have made a significant contribution to the broad patterns of our history, namely the transportation of lumber between the Northern California Coast and Pacific Northwest and the marketplace ports of San Francisco, Los Angeles, and beyond; and Criteria C (Design/Construction) because it embodies the distinctive characteristics of a type, namely the Pacific lumber schooner, and it represents the work of a master, namely shipbuilder Hans Ditlev Bendixsen. The period of significance is 1895-1954, reflecting its year of construction through the end of its active sailing life, in its third career as a codfishing vessel.

INTEGRITY

¹ National Park Service (1979), np.

² National Park Service, National Register Bulletin 20: Nomination Historic Vessels and Shipwrecks to the

National Register of Historic Places, Washington, DC, National Park Service, 1985, 8-9.

Evaluation of Significance

Integrity refers to the ability of a property to convey its historic significance, generally achieved by the retention of some or all of seven aspects including location, design, setting, materials, workmanship, feeling, and association.

The *C. A. Thayer* retains integrity of location and setting because it remains berthed in the water, and is in San Francisco, its historic home port where it was commissioned by the E. K. Wood Lumber Company. The *Thayer* retains integrity of design, materials, and workmanship because all of the repairs, restoration, and reconstruction completed during the period of time that the vessel has been under the management of the National Park Service have been to the specifications of the *Secretary of the Interior's Standards for Historic Vessel Preservation Projects with Guidelines for Applying the Standards*. Work was completed using historic documentation, replacement of materials in kind unless deemed not possible, and using traditional shipworking techniques. And the *C. A. Thayer* retains integrity of feeling and association because the retention of historic features combined with retention of location and setting enable the vessel to evoke an aesthetic and historic sense of the past.

CHARACTER-DEFINING FEATURES

A character-defining feature is an aspect of design, construction, or detail that is representative of a historic resource's function, type, or architectural style. Character-defining elements include the overall shape of the historic resource, its materials, craftsmanship, decorative details, interior spaces, and features, as well as the various aspects of the resource's site and environment. Character-defining features of the *C. A. Thayer* include:

- General specifications including length of 156', beam of 36' 8", and depth of 11' 6";
- All material components of rigging constructed and installed between 2015

and 2019, reflecting the vessel's historic rigging configuration;

- All material components of the hull restored and/or replaced between 2003 and 2007, reflecting retention of historic material where possible and replacement in-kind using historic working techniques where deemed necessary;
- All material components of the deck restored and/or replaced between 2003 and 2020, reflecting retention of historic material where possible and replacement in-kind using historic working techniques where deemed necessary;
- Open spatial arrangement within the hold, reflecting its historic use as a lumber hold;
- General open plan of the deck, excluding forward deckhouse and aftcabin, reflecting the deck's historic use storing nearly half of its cargo load;
- Decorative paint and woodwork located at the bowsprit and transom; and
- Lumber port doors at the transom, reflecting the vessel's historic use as a lumber schooner.

The *Thayer* has been restored using all available archival documentation including historical photographs, documents, and drawings in the collection of the San Francisco Maritime National Historical Park; construction contracts for similar lumber schooners; construction drawings from other Bendixsen-built schooners; and first-person accounts of the ship. If additional information should come to light in the future that provides more a more accurate account of the historic features of the *C. A. Thayer*, character-defining features outlined in this document may be reevaluated.

A further-delineated list of components of the character-defining features of the *C. A. Thayer*

Evaluation of Significance

developed by National Park Service staff is included in Appendix E.

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Condition Assessment

INTRODUCTION

Existing conditions at the *C. A. Thayer* were surveyed during multiple site visits in 2020 and 2021. The vessel was visited while in dry dock in September 2020 and at its permanent berth at the Hyde Street Pier in April 2021. The scope of the assessment was limited to visual inspection and did not include any materials testing or destructive investigation. Observations were made from the ground, deck, or pier only, without the use of ladders or aerial lift equipment.

Conditions have changed substantially since the assessment described in the 1991 HSR. A multiphase, multiyear rehabilitation project was recently completed at the *C. A. Thayer*. The details of treatments undertaken between 2003 and 2020 can be found in Part III – Record of Work Performed. The work completed was extensive in scope and scale and has addressed the severe deterioration described in 1991.

As the recent treatment work has left the *C. A. Thayer* in good physical condition, this assessment will focus on conditions relating to access, use, and maintenance. Where material conditions are noted, they are typically described being in “good, fair, or poor condition.” Good condition indicates that the material does not show signs of active deterioration and is not currently in need of repair beyond routine maintenance to finishes. Materials identified as being in fair condition exhibit active deterioration, but in limited quantities or locations. Poor condition means that deterioration is advanced, and the material or feature will require extensive repair or possibly replacement in kind.

The *C. A. Thayer* is in good material condition overall, with recent major repair and rehabilitation work contributing to a stable structure largely in need of only future routine and recurring maintenance. Architectural conditions that impact

the schooner’s use and function are more varied. The following topics are discussed as they pertain to each area or space aboard the *C. A. Thayer*:

- Sailing ability and ease of preparation for sailing
- General visitor access and safety
- Disabled access
- Interpretation and exhibits

These topics are discussed as they apply to each section or area of the ship.

PIER AND APPROACH

The *C. A. Thayer* is permanently docked on the west side of the Hyde Street Pier. The pier itself is in need of major structural repair, which is being studied under a separate project. The pier decking and guardrails adjacent to the *C. A. Thayer* are intact and functional. The pier area immediately adjacent to the ship is vacant and open, with space to accommodate further pier-side storage lockers if needed.

Visitors can view the outer sides of the ship, including the hull and bow and stern, from the pier deck where they are exposed above the water line. Following recent drydock maintenance, the hull and stern are in good condition with recently renewed finishes.

Visitors access the ship via a contemporary aluminum gangway. The gangway has been recently installed (c. 2016) and is in very good condition. It rests primarily on the pier, so it can be pulled back when the *C. A. Thayer* departs the pier. The gangway itself has a slope and handrails that comply with accessibility requirements.

The gangway ends in a platform above the side of the ship, where it meets a wooden platform and stairs leading down onto the deck of the *C. A. Thayer*. The stair assembly rests directly on the deck, without permanent attachment to the ship’s

structure. The contemporary platform, constructed of pressure-treated lumber, is in good condition. The top rails at the platform guardrail have been painted, but the assembly was otherwise unfinished at the time of survey. Sailing the vessel may require removal of the stair assembly from the deck or additional efforts to secure it.

The platform and stair assembly does not meet all building code requirements for stairs, including handrail extensions, but is functional and adequate to handle typical visitor loads. There is no wheelchair access to the ship.

MAIN DECK

Visitors to the *C. A. Thayer* enter the ship via the main deck as they step off the entrance stairs. The main deck is easily navigable on foot, although it does have a variable slope for drainage (camber). The cross slope does not meet accessibility requirements at all deck areas.

Overall, the main deck is open and available for visitors, but as a functional ship poses minor hazards to anyone unaware of their surroundings. The booms, gaffs, and related rigging equipment pose overhead hazards throughout the main deck area, even when not rigged for active sailing. The sides of the ship (bulwarks) are of an adequate height and solid assembly to serve as a guardrail. The Douglas fir decking is in very good condition following drydock maintenance in 2020 but is vulnerable to damage from sharp footwear and is slippery when wet.

The center of the main deck is marked by the two hatches. The hold is accessed via the forward hatch, so that hatch has a contemporary, removable door and stair cover assembly mounted to its port side, opening to an interior stair. The door itself is wood frame with a wire mesh panel, with no door hardware. The main hatch is covered by reproduction hatch boards, which are available to be touched or walked on by visitors.

At the time of survey, the main deck was largely clear and free from ropes and other equipment needed for sailing. This allows for safer visitor access but preparing the vessel for a sailing trip

would likely require substantial time. Park staff have indicated that storage space aboard the ship is inadequate for keeping all necessary *C. A. Thayer* gear and equipment.

There are currently no exhibits, displays, or signs located at the main deck.

POOP DECK

The poop deck can be reached via moveable stairs or a ladder only. It has no guardrails, only a low horizontal taffrail with widely spaced stanchions. Fall hazards can be avoided only by standing near the center of the deck. The poop deck is open at the ends where it meets the main deck, with only its slightly elevated height stopping visitors from easily entering.

The wheel and steering gear, which are of major visitor interest, are located at the poop deck.

AFT CABIN (AFTERHOUSE)

The aft cabin is the most architectural area aboard the *C. A. Thayer*, with multiple rooms and interior finishes. The cabin can be entered via the door opening at the main deck, or via a ladder from the poop deck. The door opening features a large step up from the main deck level, with no handrail on the interior or exterior.

At the time of survey, restoration work was ongoing at the aft cabin. The interior configuration includes a corridor with rooms on both sides. The larger spaces (saloon and master's cabin) are finished at the walls with wood paneling that has a faux wood grain finish on it, historically intended to make the less expensive redwood look like hardwood. The paneling and finish are currently in poor condition, with some damage to paneling near floor level and typical scuffing and abrasion of the finish. Similar paneling located at the ceilings has been painted and appears in good condition. Wood flooring was mostly covered with construction protection during the survey but appeared in fair condition where visible.

The smaller spaces inside the aft cabin are finished with painted wood beadboard, which is typically in good condition.

Condition Assessment

The aft cabin interior spaces are typically narrow and without adequate accessible maneuvering clearances. Interior spaces are separated by raised thresholds and narrow doorways, which would prevent accessible interior circulation even where other clearances are adequate.

The spaces inside the aft cabin were empty at the time of survey.

climbing over the keelson assembly. Overhead clearance is low at the bow and stern ends of the ship.

There are currently no displays or exhibits inside the hold.

FORWARD DECKHOUSE

The structure of the forward deckhouse was recently rebuilt at the time of survey and in excellent material condition. The interior of the deckhouse currently has a completely open plan, however, with no interior walls or dividers. The historic configuration and layout will be duplicated and installed in coming years by SAFR shipwrights to include a forward berthing area, a galley with cook's cabin and a donkey engine room. A steam donkey engine is being researched and sought for restoration and installation.

The forward deckhouse has a single step at either entrance, with no accessible entrance. Current plans intend for visitors to view the interior spaces from the deck/exterior only, as all interior spaces would be visible from the door and window openings.

HOLD

Access to the hold is via a contemporary moveable wood and metal stair set inside the forward hatch. There is only one entrance (which also serves as the exit) for visitors. The stair is a steep, single run to fit the short horizontal distance between the deck and landing inside the hold. The stair is steeper than normally permitted in a building, and the handrails are not fully compliant.

The old-growth timber visible inside the hold includes both original and replacement material and is in good condition following recent repairs and maintenance work.

The hold is of major interest to visitors, but its shape and configuration poses some hazards. Once inside the hold, the steeply sloping hull and ceiling make walking difficult. Crossing between port and starboard sides of the ship requires

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Part II: Treatment and Work Recommendations

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Section Eight

Historic Preservation Objectives

The *C. A. Thayer* is a National Historic Landmark and listed on the National Register of Historic Places. As such, it is important that all future work on the ship be carried out in accordance with *The Secretary of the Interior's Standards for Historic Vessel Preservation Projects with Guidelines for Applying the Standards* (the Standards). The Standards provide general information for stewards of historic vessels to determine appropriate treatments. They are intentionally broad in scope to apply to a wide range of circumstances and are designed to enhance the understanding of basic preservation principles. The Standards are neither technical nor prescriptive but are intended to promote responsible preservation practices that ensure continued protection of historic vessels.

The Standards include eight general standards, and then additional specific standards based on the appropriate treatment approach. There are five treatment approaches that may apply to the *C. A. Thayer* – protection, stabilization, preservation, rehabilitation, and restoration – which are defined as follows:

Protection is the act or process of applying measures designed to affect the physical condition of a vessel by defending or guarding it from deterioration, loss, or attack, or to cover or shield the vessel from danger or injury. Such treatment is generally of a temporary nature and anticipates further historic preservation treatment.

Stabilization is the act or process of applying measures designed to arrest, retard, or prevent deterioration of a vessel, and to assure its structural integrity. This may include rendering the vessel weather resistant and watertight. The

essential form of the vessel shall be maintained during this process.

Preservation is the act or process of applying measures necessary to sustain the existing form, integrity, and materials of a historic vessel.

Rehabilitation is the act or process of returning a vessel to a state of utility through repair or alterations that make possible an efficient contemporary use while preserving those features of the vessel that are significant to its historical, naval architectural, technological, or cultural values.

Restoration is the act or process of accurately recovering the form and details of a vessel as it appeared at a particular period of time by removal of later work, or by replacement of missing or substantially deteriorated earlier work.¹

Past projects, described in detail in Part III, followed the treatment approach recommended in the previous draft HSR: restoration. Moving forward, individual projects may fall under varying treatment approaches once the main restoration project is complete. For example, recurring maintenance activities may be approached as protection or stabilization, depending on the extent of work needed. Future treatment of elements already restored should generally follow a preservation approach, assuming the overall restoration work is successful. Improvements to visitor access may follow a rehabilitation approach, to support *C.A. Thayer's* use as a museum and public interpretive site.

In keeping with The Standards, interventions, structural improvements, and ongoing maintenance should be undertaken as necessary

¹ Michael Naab, *The Secretary of the Interior's Standards for Historic Vessel Preservation Projects with Guidelines for Applying the Standards*, (Washington

D.C.: U.S. Department of the Interior, Office of the Secretary, National Park Service, National Maritime Initiative, 1990).

Historic Preservation Objectives

while minimizing the loss of historic fabric and retaining the existing form and appearance of the historic features. If possible, interventions should be designed to be reversible. Features should be thoroughly documented photographically before any work is undertaken in order to chronicle changes and to aid in reversing any alterations that become inappropriate in the future.

As a National Historic Landmark, *C.A. Thayer* must be held to the highest standard of care regardless of the appropriate treatment approach for a project. The National Historic Preservation Act requires that the NPS “shall to the maximum extent possible undertake such planning and actions as may be necessary to minimize harm to the landmark.”²

The goal of this document is to manage the current use of *C. A. Thayer* as a museum and public interpretive site. In support of that use, improvements for visitor access and safety, as well as ongoing ship maintenance and repair, are recommended. The following sections, Requirements for Work and Work Recommendations and Alternatives, provide guidelines and recommendations for the continued restoration, preservation, and rehabilitation of the *C. A. Thayer*.

² The *National Historic Preservation Act*, as amended through December 16, 2016, Section 306107. Planning

and actions to minimize harm to National Historic Landmarks (PDF p. 42).

Section Nine

Requirements for Work

APPLICABLE SAFETY LAWS AND REGULATIONS

Different regulations may apply to the *C. A. Thayer* depending on a final determination for its active use. If sailing or in active use as a ship, maritime and United States Coast Guard regulations would apply. If a permanently moored vessel, building codes would likely be applicable. Some flexibility may initially be required until a final use is determined.

Fire Protection

Considering the all-wood structure and unique significance of the *C. A. Thayer*, voluntary fire protection measures may be warranted. Smoke detectors inside the hold, improved security onboard, and fire sprinkler systems inside the aft cabin and forward deckhouse are advised. A full evaluation by a fire protection engineer is attached in Appendix F.

Hazardous Materials Abatement

Considering the extensive restoration completed over the past 20 years, hazardous materials are unlikely to remain in accessible locations at the *C.A. Thayer*. The exception is the original finish inside the aft cabin, which may contain lead paint. Lead paint does not need to be removed if the paint coating remains intact, however, as is the case here. If historic painted finishes may be disturbed during future work, however, testing should be conducted to identify potential hazardous materials and determine an appropriate treatment of abatement or encasement.

Universal Accessibility

In addition to the governing codes, NPS Management Policies require all historic structures to provide the “highest feasible level of physical access to historic properties that is reasonable,

consistent with the preservation of each property’s significant historical features.”¹ Currently, disabled access is provided up the gangway leading to the *C. A. Thayer* but ends at the top.

Disabled access can be provided via equivalent facilitation if physical modifications would create an adverse effect on a historic structure. Equivalent facilitation could include virtual tours, a physical model, or other methods of experiencing the *C. A. Thayer* from an accessible location.

Ideally disabled access would be provided at least to the main deck of the *C. A. Thayer*, but further study is needed. Accessibility solutions need to be carefully weighed to evaluate impacts to historic materials, likely costs, and overall feasibility. At a minimum, providing disabled access onto the main deck will be challenging and require a custom designed solution.

¹ National Park Service, *Management Policies 2006* (Washington, D.C.: U.S. Department of the Interior, National Park Service, 2006), 5.3.2, 66.

Requirements for Work

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Section Ten

Work Recommendations

WORK RECOMMENDATIONS AND ALTERNATIVES

The following recommendations are based on conditions observed during site visits, and a series of meetings with park staff. Full minutes of meetings can be found in Appendix H, and conclusions documented in those minutes are considered adopted recommendations, even if they are not specifically repeated in this section. On many topics, recommendations listed here are discussed in greater detail in the meeting minutes.

While alterations are necessary to improve access and visitor safety, care must be taken to ensure that character-defining features and the resource's historic integrity are preserved and intact.

OPERATIONAL AND GENERAL RECOMMENDATIONS

Sailing

- Consult a naval architect to evaluate the condition of the keel, floors and framing at the bottom of the hull before planning any sailing trips.
- *C.A. Thayer* will not be sailed on a routine basis or modified to become a U.S. Coast Guard-approved passenger carrying vessel.
- Sailing of *C.A. Thayer* would consist of raising a limited amount of sail, a crew of staff and volunteers only, and a duration limited to several hours in light winds. Strong winds or currents may cancel sailing. *C.A. Thayer* will be escorted by one or two tugboats.
- *C.A. Thayer* shall be presented and interpreted to visitors as a "sail ready" vessel.

Ship Structure Restoration

- Install a second worm shoe, as seen on Bendixsen drawings
- Remove, replicate, and install a new rudder to remove marine borer damage
- Plan for the eventual replacement of remaining historic material, including centerline timbering (keel, keelsons, floors, lower frames, planking, and ceiling)
- Consult a naval architect to determine if the ship can support the weight of an operational donkey engine and/or anchors.
- For future restoration efforts, continue to improve designs where further research has been completed, such as paint colors or the shape of gaff and boom jaws.

Maintenance

- Continue routine and preventative maintenance, including drydocking as necessary.
 - 4-year minimum haul-out schedule
 - 10-year cycle for spar replacement
 - Turn the ship in her berth at the return of each dry-docking
 - Keep sails off during rainy season
 - Consider incorporating fresh-water exposure as part of haul-out cycle
- Maintain *C.A. Thayer* in a state that allows for movement to and from the pier, even if not sailing.

ARCHITECTURAL RECOMMENDATIONS

General

- Install small-scale storage on pier adjacent to ship to accommodate Park storage needs.
- Restore forward deckhouse to its historic configuration and appearance, as identified in the HABS/HAER drawings on the deck plan sheet.
- Create an exhibit design for the vessel. Consider incorporating safety measures or fire protection measures as part of exhibits. Priorities for future exhibits include:
 - Visually unobtrusive design
 - Avoid interference with sailing capabilities
 - Interpretation of the vessel as outfitted during first launch, including equipment, furniture, tools, and related supplies
 - Furnishing and fitting out of cabin spaces by period, with a final design to be identified as part of a Historic Furnishings Plan
- Create a signage plan for the vessel. Ideally signage standards will be consistent throughout the park. Install signs to better manage visitor access and safety at the *C. A. Thayer*.
 - Install signage to identify restrictions on visitor footwear.
- Repair and restore finishes inside aft cabin. Historic finishes analysis should be part of restoration design. Coordinate final finish design and appearance with exhibit design.
- Restore the bulkhead in the aft cabin passageway and return cabin to its original configuration.

Safety and Accessibility

- Limit occupancy onboard as recommended by the Regional Fire Manager.

- Further study options to provide disabled access to the main deck while also maintaining the ability to sail the ship and avoid permanent impacts to the vessel.
- Install exit signage and emergency lighting inside the hold.
- Provide signage at entrance to ship warning of overhead hazards and limited access areas.
- Limit visitor access to the poop deck, foredeck, and cabin deck. Consider access for small groups only with park escort.
- Consider occupancy limits inside the aft cabin, and reversible improvements such as threshold markings and the ability to fix doors open, to mitigate non-compliant egress conditions. Since full compliance is not possible, any measures shall be undertaken in negotiation with NPS Regional Fire Manager.
- Provide some form of equivalent facilitation for disabled access inside the aft cabin. Coordinate the exhibit design with opportunities for equivalent facilitation.
- Further study options to provide public access inside the hold.
 - Provide a second exit from hold (one exit at each of the hatches).
 - Consider installing a level walking surface if visitors are allowed inside without Park escort.
- Provide some form of equivalent facilitation for disabled access inside the hold. Coordinate exhibit design with opportunities for equivalent facilitation.

BUILDING SYSTEMS RECOMMENDATIONS

There are minimal systems onboard the *C.A. Thayer*, so the only engineering assessment performed as part of this project was a fire protection analysis. Recommendations are summarized here, but the full text of the fire

Work Recommendations

protection engineer's report can be found in Appendix F.

- Replace existing lighting with low voltage LED equipment and install LEDs for any future lighting needs.
- Install the bilge pump inside a fire-resistant steel cabinet.
- Take precautions during construction activities on board, including removing flammable materials when not actively in use and charging tools off vessel.
- Provide auxiliary power infrastructure for lights, power, and electronics. Power supply will be temporarily installed on an as-needed basis.

Security

- Install locks at all access points aboard, including at openings into hold.
- Install a security camera system with video motion detection throughout the ship. Improve security of door to hold.

Fire Protection

- Install an air sampling smoke detection system in the hold.
- Install a water mist fire suppression system inside the 2 deck houses. Take special care to conceal sprinkler piping without damaging the historic finishes.
- Incorporate fire protection design into any future major projects, such as exhibit design.

Work Recommendations

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Part III: Record of Work Performed

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Section Eleven

Completion Report

This section of the report was written by Michael R. Harrison, with revisions dating to December 2020.

INTRODUCTION

The three-masted lumber schooner *C.A. Thayer* is a National Historic Landmark and one of six ships exhibited to the public at Hyde Street Pier in San Francisco by the San Francisco Maritime National Historical Park. The National Park Service has been working to restore the *C.A. Thayer* vessel to its original 1895 form and condition through a multiphase, multiyear project that has been ongoing for nearly two decades. The hull of the *Thayer* was restored between 2003 and 2007, the rig between 2015 and 2019, and the deckhouses in 2019 and 2020. Planning for this restoration dates back to at least 1987. This report forms a record of treatment of the *Thayer* as an historic resource, summarizing why and how restoration and rehabilitation work was carried out and detailing the timing and cost of the work, when those details have been available in the archival record.

The *C.A. Thayer* was constructed in 1895 at the Fairhaven, California, shipyard of Hans D. Bendixsen for use by the E. K. Wood Lumber Company in the West Coast lumber trade. Built of wood with double-sawn frames, the vessel is carvel planked and modeled with a relatively shallow and wide hull and a single deck, providing a large, unobstructed hold. It is rigged as a three-masted schooner with pole masts. After storm damage in 1912, the *Thayer* was sold to become a

salmon station supply vessel, making yearly trips to Alaska. Additional lumber voyages to Australia followed during World War I. Sold again in 1924, the *Thayer* was used for codfishing in the Bering Sea, based out of Puget Sound. Laid up during the Great Depression, the vessel was taken over by the Army in 1942 for use as a barge. Five additional codfishing voyages followed the war, the last in 1950. After a period of layup, the *Thayer* was beached along the Hood Canal in Washington State for use as a roadside attraction. The California State Department of Natural Resources, Division of Beaches and Parks purchased the schooner in 1957 for the new Maritime Park at Hyde Street Pier in San Francisco. The vessel was restored in Seattle, sailed down to the Bay area, and restored further in Oakland (as detailed in the Supplement that starts page 31). The *Thayer* opened for public visitation at Hyde Street Pier in 1963. Due to its national significance, the *Thayer* was declared a National Historic Landmark in 1966 and added to the National Register of Historic Places at the same time. The vessel was transferred to the National Park Service (NPS) in 1977 as part of the Golden Gate National Recreation Area (GOGA); *Thayer* became part of the newly independent San Francisco Maritime National Historical Park (SAFR) in 1989. The vessel's primary function since 1963 has been to serve as a floating museum ship about West Coast maritime history. For many years, until 2004, this included hosting the park's environmental living program, which communicated ideas about traditional shipboard life to primary school children.¹

¹ Summary history of the *C.A. Thayer* adapted from National Park Service, *Environmental Assessment. Rehabilitate 1895 National Historic Landmark Schooner C.A. Thayer*, July 5, 2002, 5–6, and Stephen Canright, "Narrative Description of Thayer Rehabilitation Project,"

April 22, 2002, in HDC 1765, subseries 2.1, box 6, folder 1.

C.A. Thayer was declared a National Historic Landmark (NHL) on November 13, 1966, based on a 1965 survey conducted as part of the National Survey of Historic Sites and Buildings. As an NHL, *Thayer* was

The Problem Facing the C.A. Thayer

The *C.A. Thayer* is a National Historic Landmark and, as such, is specifically mentioned in the enabling legislation for San Francisco Maritime National Historical Park “as one of the major vessels essential to the nature of the Park.” In the NPS list of classified structures, the *Thayer* is assigned a management category of A, meaning it “Must be preserved and maintained.”²

The *Environmental Assessment* issued by the park prior to the start of the *Thayer’s* rehabilitation reported that the schooner received 200,000 visitors a year, including 12,000 school children taking part in interpretive programs and 15,000 children for overnight programs. The *Assessment* warned that “In the absence of major repairs the *C.A. Thayer* is certain to ultimately suffer structural failure, requiring its removal from the water and, in all likelihood, disassembly. This would result in the total loss of *C.A. Thayer* as a nationally significant resource and as a floating classroom to various youth education programs.” Furthermore, the park staff noted that the rehabilitation of the *Thayer* would “support the vessel’s maintainability by changing its maintenance from short-term crisis management to a long-term maintenance management plan. . . . Managers will be able to predict and establish a level of manpower required for maintaining the vessel and eliminating the need for use of high cost emergency repairs and services. . . . In the last two years [2000–02] the deteriorated condition of the vessel has required the full-time service of a shipwright to manage emergency services, make repairs, and manage

the bilge pumps. This yearly expense is estimated at \$50,000 of unplanned operating base funds.”³

The *C.A. Thayer* was already an old ship at the end of its useful life when collected by the state of California in 1957. Although extensively restored between 1957 and 1963, the hull continued to deteriorate during its years as an exhibit at Hyde Street Pier. As SAFR historian Stephen Canright has written, “As early as the late 1970s, when the National Park Service took over the *Thayer*, her hull was fatally weakened with dry rot in the upper frame timbers. Douglas fir is a lovely shipbuilding timber, but it is a softwood and is famously susceptible to rot. The traditional structure of a wooden ship, with the frames encased between the outer hull planking and the inner ceiling planking, is an ideal breeding ground for rot. When rainwater finally seeps into the structure, the frames stay wet and rot takes hold.”⁴

Morris Guralnick Associates, Inc., in a summer 1991 report recommending preservation strategies for the *Thayer*, noted, “The topside hull planking and deck of *Thayer* have not been watertight for a long time. Rain and fresh water from deck washing have been leaking in and carrying rot fungi deep into the structure for years. As the fungus grows, it permeates the wood with microscopic strands. When it matures, it fruits and sends its spores to other uninfected parts of the wood. . . . The topside heats in the sun all day and provides the warm and moist environment that is perfect for the dry rot fungi to thrive.”⁵

The weakening of the hull structure was reflected in increasing hog in the ship’s keel, which was 8.5

automatically listed on the National Register of Historic Places in 1966. Inventory and nomination forms documenting the *Thayer’s* National Register status were prepared well after the fact, first in 1975 and again in 1978. The 1978 version was officially certified by the keeper of the National Register in 1979, then recertified by the NPS director of archeology and historic preservation in 1984 when a formal boundary for the *Thayer* as an NHL was defined. See *C.A. Thayer* NHL nomination file (reference number 66000229_NHL) in National Archives and Records Administration, RG 79: Records of the National Park Service, 1785–2006, series:

National Register and NHL Program Records, file: California Program Records.

² San Francisco Maritime National Historical Park Act of 1989, Public Law 100-348, June 27, 1988; *Environmental Assessment*, 6–7.

³ *Environmental Assessment*, 6–7.

⁴ Stephen Canright, “Rebuilding the *C.A. Thayer*,” *Sea Letter* 68 (2007), 6.

⁵ Morris Guralnick Associates, Inc., “Preserving the Schooner *C.A. Thayer*,” July 10, 1991, revised January 9, 1992, 10, HDC 1609, series 4.04, box 47, folder 25.

Completion Report

inches in 1958 and 9-5/8 inches in 1972, but grew rapidly to 14 inches by 1980. It reached a maximum extent of 16 inches in 2003. Other alarming deformations of the hull resulting from loss of strength in the structural components were identified in 1998 as “uneven hog curve, the deck beam deflection as evidenced by the opening up of the hanging knee to deck beam joints, and the visible dishing upward of the midships hull bottom.”⁶

The progressive and increasing deterioration of the *Thayer*’s hull over time is well documented in surveys and preservation assessments carried out in 1980, 1984, 1988, 1991, 1992, 1995, and 1998. Damage from marine borers, rot leading to disintegration of wood structure, and the hog in the keel were consistently cited as the vessel’s leading challenges. “The *C. A. Thayer* is a surveyor’s text book example of progressive deterioration of wood caused by fresh water,” David Jackson noted in his November 1998 survey report. “The 1896 edition of the *Standard American Classification of Vessels* rated Oregon pine (Douglas fir) as suitable for 10 years service as garboards, bottom, and topside planking and 9 years service as floor timbers and foot-hooks.”⁷

Treatment Approach

The park’s 1991 draft Historic Structure Report (HSR) for the *C.A. Thayer* summed up the situation facing the *Thayer*: “Today she faces a dilemma that, ironically, is largely due to her longevity—she has outlived the practical life span of her construction material, Douglas fir. Ravaged by dry rot, she has lost much of her structural integrity and has become increasingly difficult to maintain.”⁸

To correct this situation, the park faced a number of alternatives, which were laid out and evaluated by the 1991 HSR. These alternatives were:

- Maintain the status quo, which the report concluded would likely lead to the vessel’s eventual loss.
- Stabilization, which “would attempt to arrest or slow the vessel’s rate of deterioration but would not undertake major restoration or repairs.” This was seen as a necessary interim measure, but not a viable long-term approach to preserving the vessel.
- Preservation in a dry berth, which might reduce the rate of deterioration by removing the hull from the marine environment, but entailed high continued maintenance costs, the removal of the ship from its interpretive context, and the cost prohibitive and perhaps impractical process of finding and developing a site in the Bay area for a covered berth.
- Restoration for exhibit afloat, either through periodic repairs, restoration all at once, or restoration in multiple phases. This approach would renew (i.e., replace) “deteriorated structural elements as needed to restore hull strength and watertight integrity.” The extent of rot in the ship’s structural members was such, however, that restoration would “result in the loss of a major portion of the vessel’s historic fabric.”

The HSR concluded, “*C.A. Thayer* should be preserved in a manner that will allow her to continue in her successful role as a floating museum ship. Restoration is the only treatment that will support this use over the long term and is therefore the recommended treatment.”⁹ (See pages 93-94 for additional commentary on the 1991 HSR.)

⁶ David L. Jackson, *Report of Survey of the Three Masted Schooner C. A. Thayer*, November 23, 1998, HDC 1765, series 1.1.5.1, box 1, file 4.

⁷ Jackson, *Report of Survey of the Three Masted Schooner C. A. Thayer*.

⁸ Tri-Coastal Marine, *Schooner C.A. Thayer. Historic Structure Report Draft*, 1991, 1. [Hereafter cited as **HSR.**]

⁹ HSR, 50–51.

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The park's central philosophical challenge in undertaking a full restoration was that it would mean removing and disposing of large amounts of original fabric—as much as 80 percent of the framing and 95 percent of the hull planking, the HSR estimated.¹⁰ This large scale replacement would threaten the *Thayer's* integrity as an historic resource. The 2002 *Environmental Assessment* largely repeated the HSR's evaluation of the treatment alternatives, concluding, too, that restoration of the ship to its 1895 configuration was the preferred approach. The *Assessment* reconfirmed that at least 80 percent of the vessel's existing structural material would need to be replaced. "Such a radical degree of replacement must certainly be seen as a threat to the historic integrity of the vessel," the report admitted, but "The nature of the project, however, replacing each element in original type material, using original assembly and fastening methods, would result in a vessel that is true to the original in both form and nature."¹¹

This logic differed from the opinion expressed by an expert panel convened for a *Thayer* preservation workshop in January 1989. That group unanimously felt that the *Thayer's* significance lay "in the original fabric that she retains." The group "felt strongly that certain original elements must be preserved, if possible," in particular "the structural timbers that are visible to the public and show the 'wear and tear' of the vessel's working life."¹² A different panel of experts, organized by the park just two years later,

in 1991, felt differently. This Preservation Committee discussed the meaning of "historic fabric" as it applied to heritage watercraft. The sense of its members was that "the essence of the vessel did not consist of the individual bits of wood, that it was far more important to rebuild the vessel with the same method and materials as were used by the master builder Bendixsen."¹³

Park historian Stephen Canright further expanded on this idea in a 1999 planning document. "Beginning with its launching, any wooden vessel is subject to an ongoing process of repairs and replacements. The maritime environment is so harsh that replacements of fabric, whether major or minor, are essential for the integrity of the vessel, the question is not so much whether the current fabric is original, but rather whether the replacements which have been made over the years amount to an unacceptable alteration of the vessel as built, or an alternation of the historically significant aspects of the vessel. The crucial factor is not the extent of the replacements, but rather the manner in which the replacements have been made."¹⁴ Despite the amount of replacement, Canright later wrote, "The end-point is not a new vessel duplicating the original, but rather the original renewed, with the strength to float for another century."¹⁵

¹⁰ HSR, 60.

¹¹ *Environmental Assessment*, 10–15, quote from 13. The *Environmental Assessment's* restoration approach involved "adaptive rehabilitation," which was not a strict restoration of both exterior and interior to the 1895–1912 period of significance. Adaptive rehabilitation envisioned returning the exterior to the period of significance but allowed the interior to be adapted in selected ways to better serve the needs of park programming, particularly the environmental living program for school children. Certain nonhistoric alterations to the vessel would be retained: the passageway through the afterhouse, the stairs in the forward hatch, the fishermen's forecastle, the plumbing

and electrical systems. It was also suggested that the forward house would be restored externally but reconfigured internally to allow for a larger galley.

¹² Tri-Coastal Marine, Inc., "C.A. Thayer Preservation Workshop: A Discussion of Preservation Options. Summary and Conclusions," February 10, 1989, HDC 1600, series 3.19, box 204, folder 20.

¹³ "C.A. Thayer Preservation Committee Meeting" [report], June 1991, 4, HDC 1609, series 4.04, box 47, file 18.

¹⁴ Stephen Canright, "Recommendations for Design Changes," in *C. A. Thayer Project* [booklet], [1999?], HDC 1765, series 1.1.5.3, box 3, file 1, folder 2.

¹⁵ Canright, "Rebuilding the C.A. Thayer," 6.

REHABILITATION OF THE C. A. THAYER, 2003-2007

"The scale of the work on the West Coast lumber schooner *C.A. Thayer* is without precedent in the history of maritime preservation," Stephen Canright wrote in 2007. "This is easily the largest wooden merchant shipbuilding project completed in the United States since the 1920s." ¹⁶

Furthermore, "The work that we have done is comparable in every important respect to the original construction. The process of doing the work has revealed to us the secrets of West Coast shipbuilding that would otherwise have been lost to the sands of time. . . . The opportunity to work with these magnificent sizes and lengths of beautiful, tight-grained fir has been a gift." ¹⁷

"We're preserving the vessel as a whole machine," Canright told a reporter for the *East Bay Express*, "the pieces will again interact in the way they were designed to interact. In a hundred years, if somebody opens this up again, they can be confident that 'Yeah, that is how it was built.'" ¹⁸

The project team for the *Thayer* rehabilitation included

- SAFR staff
- Designers and Planners, Arlington, Virginia: naval architects, planning and engineering supervision
- Allen Rawl, shipbuilder: on-site technical representative
- Defense Logistics Agency: wood acquisition
- Bay Ship and Yacht Company: contractor

¹⁹

Problems Corrected

The rehabilitation of the *C.A. Thayer* corrected the following significant long-standing problems with the vessel:

- Rot throughout the wood structure
- Hog in the keel
- Deterioration of steel fastenings
- Structural weakness in the stern
- Incorrect shape of the transom and stern overhang, which had been shortened by 6 inches in the 1940s
- Deck hatches returned to original size
- Camber made consistent along the length of the deck
- Missing forward portion of the wormshoe restored

Restoration Techniques

The project sought to employ techniques and types of materials used to construct the *Thayer* originally. This included:

- Replacing deteriorated Douglas fir components in kind, with new Douglas fir, and, when possible, in the same lengths as originally used.
- Retaining structurally sound original material in the keel, lower frames, and the hull bottom planking.
- Using trunnels to fasten the planking, instead of metal fasteners, which had been used in earlier repair campaigns. (Contract specs estimated that 22,000 feet of wood trunnels would be needed for the project, as well as up to 32 tons of traditional iron fastenings.)
- Shaping all replacement frames to duplicate the deteriorated frames they were replacing and fit their specific locations in the hull.

¹⁶ Canright, "Rebuilding the *C.A. Thayer*," 6.

¹⁷ Canright, "Rebuilding the *C.A. Thayer*," 24.

¹⁸ Canright quoted in Jack Mingo, "The High Cost of History," *East Bay Express*, April 6, 2005, copy in HDC 1765, series 2.1, box 4, folder 6.

¹⁹ "Rehabilitate the C. A. Thayer," Contract no. C8520030052, notice to proceed dated November 18, 2003, HDC 1765, series 1.1.5.4, box 3, file 3, folder 1.

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- Replacing the thick ceiling planking using 80-foot lengths of 8-inch fir, to match original construction.
- Constructing the thick ceiling planking at bow and stern using a double layer of 4-inch planks, to match original construction.
- Caulking in the traditional manner with cotton, oakum, and tar, under guidance of two master caulkers from Washington State.²⁰

The project made two general departures from original techniques and materials. First, Timbor, a solution of sodium borate used as a fungicide and wood preservative, was applied to all wood surfaces, both new and existing, prior to installation in the ship. Second, modern finishes were employed on painted surfaces “where the superior protection of modern coatings has overriding importance.” The painting specifications called for oil-based primers on both wood and metal surfaces, acrylic enamels for interior and exterior finished surfaces, and marine antifouling paint on the hull bottom.²¹

Changed features

The following features of the ship were altered during the rehabilitation, mostly to bring them in line with the vessel’s original 1895 configuration:

- Main hatch reduced in size by two beam spaces, to return it to its original size.
- Forward hatch extended forward by two beam spaces to return it to its original size.
- Forward deckhouse redesigned to return it to its original size and layout; this work not implemented until 2020.
- Fish handling ports through the midship bulwarks, port and starboard, eliminated.

- Square scupper above waterway to port eliminated.
- Scuppers made to pass through the waterway timbers as in original design.
- Fisherman’s forecastle removed and its components placed in museum storage.
- False sole in hold, from the cod-fishing period, removed.²²
- Hawse pipes that had been installed through the poop deck bulwark, in order to moor the vessel at Hyde Street Pier, eliminated.²³

Historic fabric removed

The following classes of historic fabric were removed and replaced during the rehabilitation:

- Decking (not original)
- Deck beams
- Bulwarks
- Topside planking (containing mostly replacement material already)
- Thin ceiling planking (original)
- Thick ceiling planking (original)
- Upper futtocks (mostly original)
- Upper and lower futtocks and floor timbers at bow and stern (original)
- Upper sister keelsons on port and starboard removed to allow inspection for rot in lower sister keelsons (original)
- Salt shelves
- Sections of the garboards and lower sister keelson fore and aft to allow access to lower frame timbers at the ends of the hull (original)
- Stem post and apron replaced. (Original stem post had been partly replaced in

²⁰ “Historic Vessel C.A. Thayer. Rehabilitation. Statement of Work,” draft, December 12, 2001, in HDC 1765, subseries 1.1.5.3, box 3, file 12, folder 1.

²¹ “Historic Vessel C.A. Thayer. Rehabilitation. Statement of Work,” draft, December 12, 2001, in HDC 1765, subseries 1.1.5.3, box 3, file 12, folder 1.

²² Stephen Canright, “Recommendations for Design Changes,” in *C. A. Thayer Project* [booklet], [1999?], HDC 1765, series 1.1.5.3, box 2, file 1, folder 2.

²³ Brian K. Lippert to Bill Elliott, November 4, 2005, HDC 1765, series 1.1.5.3, box 3, file 20, folder 4.

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1961, but remaining section was now rotten.)

- Upper section of stern post
- Rudder trunk
- Quarter knees
- Sill timber at forward end of afterhouse

Equipment and fittings retained at time of disassembly

- Davits
- Wheelbox
- Steering gear
- Binnacle
- Mizzen boom crutch
- Hold ladders
- Quarter deck ladders
- Edson pump
- Windlass
- Capstan
- Anchors
- Quarter bitts
- Samson post and forward bitts
- Staysail boom tabernacle
- Catheads
- Forward 6 feet of the forward deckhouse
- Deckhouse interior fittings
- Fisherman's forecastle structure and joinery
- After cabin (lifted in place during rehabilitation of hull) ²⁴

Costs

The project was initially expected to cost \$9,744,800 for gross construction and \$110,000 for planning and design. A June 2004 status report revised the amount of funding needed for gross construction to \$13,734,000 (\$12,248,000 for net construction and \$826,000 for contingency) and for planning and design to \$115,000. Increases in the cost of labor and materials contributed to these revised numbers. As well, the amount of deteriorated material in the ship was found to greatly exceed initial estimates. The number of deck beams needing to be renewed, for example, turned out to be 50 percent over estimate; framing, 60 percent over; ceiling planking, 40 percent over; deadwood, 10 percent over. ²⁵

The funding for the *C.A. Thayer* rehabilitation came from the following federal line-item-construction appropriations.

FY 2002	\$4,639,000
FY 2003	\$979,800
FY 2004	\$4,126,000
FY 2005	\$2,093,000

Additional funding also came from the Regional Cultural Resources program (for the bulwark planking), and the park's FY 2007 budget (the rail cap, installed starting in September 2006). ²⁶

Bay Ship and Yacht Company of Alameda, California, received the rehabilitation contract in 2003. Their initial contract award was \$3,952,033.59. Over the life of the project, there were 21 contract modifications authorizing additional phases of work, leading to a final contract award total of \$11,198,386.22. ²⁷

²⁴ Bay Ship and Yacht Co., "CA Thayer Restoration Plan," revision 5, July 15, 2004, HDC 1765, series 1.1.5.3, box 3, file 20, folder 4.

²⁵ Michael Bell, "Project Status Report," June 29, 2004, HDC 1765, series 1.1.5.3, box 3, file 20, folder 1.

²⁶ WASO Construction Management, email to SAFR Superintendent, re: Director's approval of LIC Package SAFR 005588-643, March 30, 2004, HDC 1765, series 1.1.5.1, box 2, file 20, folder 1; "Scope of Work for

Contract Modification No. 10," May 3, 2005, HDC 1765 digital files, series 1.2.1.1, file 1, //data/AllenRawl data ACR Inc/CAT - SAFR Transfer of files (1)/MOD-10 SCOPE-5-3-05.doc

²⁷ "Rehabilitate the C. A. Thayer," Contract no. C8520030052, notice to proceed dated November 18, 2003, HDC 1765, series 1.1.5.4, file 3, folder 1; "C.A. Thayer Cost Summary Info." May 8, 2007, HDC 1765, series 1.1.5.4, box 3, file 3, folder 2.

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Work not completed

The 2003–2007 restoration was planned to return the vessel completely to its 1895 condition, including the rig, deckhouses, and other equipment and fittings. The amount of rehabilitation work needed in the hull exceeded original estimates, leading to a budget shortfall in the project. As a result, portions of the restoration work were held for completion later. These were:

- Completion of upper sister keelsons
- Completion of thin ceiling planking
- Fabrication and installation of salt shelves in hold
- Fabrication and installation of diagonal pointers at bow and stern
- Fabrication and installation of lumber loading platform in hold at stern
- Fabrication and installation of rudder and steering gear box
- Restoration and installation of steering gear
- Restoration of forward house
- Installation of donkey engine, galley stove, and other forward house fittings
- Interior restoration of afterhouse
- Fabrication and installation of taffrail
- Fabrication, installation, and decorative carving of fiddlehead
- Fabrication and installation of chain locker hatch
- Fabrication and installation of masts, spars, and rigging

- Restoration and reinstallation of windlass and hand bilge pump
- Installation of ballast
- Permanent bilge pump system (temporary one installed)
- Permanent electrical system (temporary one installed) ²⁸

Sourcing lumber

SAFR staff spent ten years attempting to source timber of the right size and quality to restore the *Thayer*, beginning from the time a restoration plan for the vessel was first formulated in 1991. Their extensive efforts are well documented in the park archives. ²⁹

Tri-Coastal Marine prepared the first list of required timber, which was refined by Stephen Canright and promulgated in a memo dated November 18, 1993. It included 1,947 individual pieces totaling 361,823 board feet, including 43 pieces at a length of 80 feet or longer. ³⁰ “The intent of the lumber specification,” Canright wrote in 1995, “is to duplicate the material originally used in the vessel, as is required by *The Secretary of the Interior’s Standards for Historic Vessel Preservation Projects* (1990). To achieve both historical and structural integrity in the work, timbers of dimensions not commonly available on the market, and of a quality not normally employed in structural work, will be required. The market cost of the required material is estimated at *two million dollars*.” [emphasis in original] ³¹

Steve Viers, a professor at California Polytechnic State University and University of California Davis

²⁸ Canright, “Rebuilding the *C.A. Thayer*,” 23; Michael Bell, email to Barbara Helphrey, re: Negative response to BSY proposals, May 20, 2005, HDC 1765, series 2.1, box 6, folder 6; “*C.A. Thayer* Negotiation Memorandum,” September 1, 2006, HDC 1765, series 1.1.5.4, box 3, file 5.

²⁹ [Stephen Canright], “Notes on *Thayer* Timber Search,” [January 1994?], HDC 1609, series 4.04, box 47, folder 25; Canright, memo to William Thomas, re: Report on Investigation of Federal Timber Prospects in Eureka Area, May 12, 1996, HDC 1609, series 4.04, box

47, folder 30; SAFR superintendent, email to Pacific West Region Regional Director, re: *C.A. Thayer*, Search for Timber and Wood Requirements, June 26, 2000, HDC 1765, series 1.1.5.1, box 1, file 3.

³⁰ Stephen Canright, “Reconfigured Timber List for *Thayer*, by the piece,” November 18, 1993. Many copies in SAFR archives; see HDC 1609, series 4.04, box 47, folder 30.

³¹ Stephen Canright, memo to Neil Chaitin, re: Timber Requirements for Rebuilding the Schooner *Thayer*, October 27, 1995, HDC 1765, series 1.1.5.1, box 1, file 3.

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hired by NPS to assist the timber search, wrote in 1993 that “the needed material represents the yield from 10–15 acres of typical Northern California old growth Douglas fir forest.” Calculations made in 1996 by George A. Lottritz, natural resource officer at Six Rivers National Forest, estimated that about 1 million board feet of log scale material would be needed to mill the project’s nearly 400,000 board feet of rough-finished material. The Forest Service was initially seen as a logical partner that might be able to supply the timber from government land, but Viers discovered that “the forest service are unable to cut enough timber to supply your needs because of injunctions resulting from threatened and endangered species litigation.” The Hull-Oakes Lumber Company of Monroe, Oregon, contacted by Viers, could handle up to 85-foot lengths, but “didn’t think there was another mill now operating that could handle the 100-foot lengths [in the park’s list], but there may be a mill that could be reopened with some effort. . . . It appears that your job is doable—with a lot of effort and money.”³²

During 1996 and 1997, it appeared that timber of a suitable grade might be become available from timber sale parcels in Six Rivers National Forest in the Eureka, Oregon, area, but this lead did not develop.³³

In June 2000, Designers and Planners, Inc., of Arlington, Virginia, presented a timber sourcing report to the park, which they has prepared under contract. The report found only one West Coast mill willing to quote for timbers larger than 60 feet in length, and found hesitancy among other

suppliers to quote for high-grade timbers in lengths larger than 20 to 30 feet.³⁴

The first order for wood for the project was for grown knees, placed with Sylvan Forest Products in June 2001. Sylvan worked with North West Wood in Port Hadlock, Washington, to source the knees. The original order for 35 knees was meant to be completed by December 31, 2002. By September 2004, the order was not yet complete, and various knees already delivered were rejected by the park on quality grounds. In the end the project acquired 24 knees at a cost of \$142,587 through Sylvan.³⁵

The real solution to the park’s timber supply difficulties came in December 2001 when Golden Gate NRA entered into an interagency acquisition agreement with the Defense Logistics Agency for the latter to locate and supply the lumber needed for the *Thayer* rehabilitation. DLA would “provide all contracting services for wood and wood related materials” and “provide field expertise and management in materials acquisition” for the vessels’ reconstruction. The revised timber list provided with the agreement called for 431,258 board feet of lumber in dozens of sizes. The contract was initially for \$83,570, but was modified three times to increase the amount of funding:

December 2001	\$83,570
September 2002	adding \$800,000
June 2004	adding \$347,193
March 2005	adding \$380,844
Final contract total	\$1,611,607. ³⁶

³² Steve Veirs, memo to SAFR Superintendent, re: Timber for Replacement of Thayer, November 16, 1993, HDC 1609, series 4.04, box 47, folder 25; Stephen Canright, memo to William Thomas, re: Report on Investigation of Federal Timber Prospects in Eureka Area, May 12, 1996, HDC 1609, series 4.04, box 47, folder 30.

³³ Stephen Canright, memo to William Thomas, re: Report on Investigation of Federal Timber Prospects in Eureka Area, May 12, 1996, HDC 1609, box 47, folder 30; Ray Murray, email to SAFR Superintendent, et al.,

re: Lumber for the Thayer, February 14, 1997, HDC 1609, series 4.04, box 47, folder 33.

³⁴ Tim McAllister and Ron Robisch, “C. A. Thayer Rehabilitation, Task 1: Pre-design and Site Analysis,” June 28, 2000, HDC 1609, series 4.04, box 47, folder 34.

³⁵ Cindy Blackman to Mike Bell, November 2, 2001; Blackman to Bell and Allen Rawl, October 6, 2004; Cadian Hendricks to Scott Wilson, November 2, 2004, all HDC 1765, series 1.1.5.1, box 2, file 5, folder 1.

³⁶ Interagency Acquisition Agreement no. F8520020019, December 5, 2001–September 30, 2002,

Narrative of the work

C.A. Thayer was towed from Hyde Street Pier to Bay Ship and Yacht (BSY) in Alameda on December 2, 2003. At BSY, while the ship was still afloat, the two remaining masts and the bowsprit were removed, as were the capstan, anchor windlass, anchors and chains. The fisherman's forecastle dismantled and removed to museum storage except for its deck. The forward deckhouse, being mostly from the 1940s, was demolished. The forward-most 6 feet of the house, determined to be original, were retained and stored for later reuse.³⁷

BSY built a steel cradle to hold the hull, and the hull was placed onto the cradle in the dry dock. Four inches of the 16-inch hog in the keel were removed at this point, as the ship settled onto the blocks in the cradle. Sixteen house-moving dollies were installed under the cradle so that cradle with the *Thayer* in it could be moved onto a barge for travel to the Alameda Naval Air Station. At the station, the *Thayer* in the cradle was moved off the barge and overland into Building 400A, an historic seaplane hangar, where the restoration work took place.

The hull was laser scanned in the hangar by staff from the Historic American Engineering Record to document its current condition. These scans and other field work formed the basis for HAER documentation of the *Thayer*. BSY's contract required that all structural components, fittings, and equipment be documented before or during disassembly to gather "all pertinent data required for reconstruction."³⁸

Scaffolding was erected around the hull in January and February 2004. Deck planking removal began in February. The bulwarks and the topside planking were removed next. Most of the topside planking

was no longer original; the fastening patterns of the trunnels on the few remaining original planks were carefully noted in order to replicate them when the new planking was eventually installed. The bottom planking was found to be generally free of rot due to long exposure to salt water and was retained. The 80 to 90 foot lengths of these wide bottom planks represent the quality of old-growth timber available to West Coast shipbuilders at the time of the *Thayer* was built. The keel and lower futtocks were also largely free of rot. "We were able to build up from a foundation of sound original material in the bottom frame, keel, and planking," Canright wrote. "Had these timbers been rotten, we would have had to write off the whole vessel and start from scratch."³⁹

Inside the hull, the thin ceiling planking below the turn of the bilge, although in generally good condition, was sacrificed to permit access to the lower frame timbers, which could not otherwise be reached because of the external bottom planking that was left in place. The project team determined it was better to lose this original ceiling planking than to lose original outer hull planking to get at the lower frames. The thick ceiling planking, from the turn of the bilge to just under the main deck, was temporarily left in place to provide a pattern to shape the replacement upper frame timbers against. Because it was rotten, it was later replaced after the frames had been restored.⁴⁰

The final 12 inches of hog were removed from the keel once the deck and topside planking had been removed, in March 2004. Gradually easing off on the jacks and wedges holding the ship in position in the cradle allowed the weight of the hull to straighten the keel in a controlled fashion. Once the keel was straight, however, it was discovered

with modifications, HDC 1765, series 1.1.5.1, box 2, file 5, folder 1.

³⁷ The progress of the restoration work is summarized from Canright, "Rebuilding the *C.A. Thayer*." Dates have been reconstructed from progress photographs of the work and from periodic website update drafts in the

SAFR archives, HDC 1765 digital files, series 1.2.1.1, file 2, //BSYContractSubmittalsDocs/Events Photography.

³⁸ Bay Ship and Yacht Co., "CA Thayer Restoration Plan," revision 5, July 15, 2004, HDC 1765, series 1.1.5.3, box 3, file 20, folder 4.

³⁹ Canright, "Rebuilding the *C.A. Thayer*," 10, 12.

⁴⁰ Canright, "Rebuilding the *C.A. Thayer*," 10, 12–13.

that line of the rabbet where the garboards meet the keel was not also straight, but had “almost 4 inches of arc.” This was accounted for by noting that the forward 40 feet of the 4-inch-thick wormshoe was missing. It was also deduced that the keel had likely been built originally with a slight convex curve—“sprung,” as it were, to accommodate a bit of hog once the vessel entered the water. The missing wormshoe section was replaced and a bit of spring built into the keel by adjusting the blocking in November 2004.⁴¹

The upper futtocks were among the most deteriorated parts of the structure. To determine the shapes of their replacements, 2.5 x 1 inch ribbands were installed along the outside of the hull to indicate the former positions of the removed hull planking. The replacement futtocks were shaped using the space between the ribbands on the outside of the hull and the thick ceiling planking on the inside of the hull. It was a vital part of faithfully rebuilding the *Thayer* that the new timbers were “patterned directly from the hull, not from any drawings,” as Canright explained. “It would certainly have been quicker to rebuild her from a crisp new design drawing, but this way of working—replacing deteriorated material piece by piece—ensured that the *Thayer* was in fact rebuilt rather than replicated. We were doing ship repair on a massive scale, and never depended on any newly derived design.”⁴²

New futtocks were butted into the original first futtocks and floors that remained in place at the bottom of the hull. Frame replacement began in spring 2004 in the relatively straight midbody of the hull, which was felt to be a safe area to “practice the patterning, shaping, and installation of the new futtocks.” Work then proceeded fore and aft every fifth frame. After these “station” frames were completed, the balance of the intervening frames were replaced. This process

allowed gradual replacement without losing the shape of the hull.⁴³

Rot in the keelsons was difficult to assess because they were hidden beneath other structural members. The presence of soft pockets in way of the steel drift pins suggested that freshwater might have infiltrated lower down, so the upper sister keelsons were removed in their entirety to allow any rot in the keelsons and lower sister keelsons to be found. In the end, the lower sister keelsons were free of rot, although areas of them fore and aft needed to be removed to allow replacement of lower floor timbers at bow and stern.⁴⁴

The stern was significantly weakened and needed complete rebuilding. As Canright explained, “The structure of the stern of the *Thayer* was a weak point in the original design. The location of the stern timber ports, which are immediately alongside the stern post, left no room for longitudinal horn timbers, which normally stiffen up the overhang of the stern. As designed, the stern got much of its strength from the heavily reinforced bulwark structure and the framing of the raised poop deck. Unfortunately, this bulwark structure had been weakened by hasty repair work done in the 1950s and by rot in the intervening years. By the time of the rebuild, the stern overhang had sagged off by about 6 inches.” Reconstruction of the stern included a new upper section of the stern post, a new rudder trunk, strong quarter knees, and full ceiling planking installed to reinforce the upper aft section of the bulwarks. The shape of the transom, shortened 6 inches in the 1940s, was restored to its original design.⁴⁵

Of the ship’s 50 hanging knees, 48 were reused, leaving two (one portside forward, one starboard aft) to be shaped new. Pockets of rot in the original knees were cut out and repaired with old-growth Douglas fir graving pieces epoxied in place.

⁴¹ Canright, “Rebuilding the C.A. *Thayer*,” 10–11.

⁴² Canright, “Rebuilding the C.A. *Thayer*,” 9, 11.

⁴³ Canright, “Rebuilding the C.A. *Thayer*,” 12. Frame 25 was the first one replaced.

⁴⁴ Canright, “Rebuilding the C.A. *Thayer*,” 14.

⁴⁵ Canright, “Rebuilding the C.A. *Thayer*,” 14.

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Borate rods measuring 4 x 1/4 inches were inserted into the knees under the repairs to prevent further decay. Each knee was then soaked in a tank of 20% Borate salt solution for 8 to 12 hours to further protect against rot. Most of these repairs were made on the upper and outer faces of the knees, where the knees had been exposed to fresh water seepage; this made the repairs invisible once the knees were reinstalled. Old fastening holes were infilled with dowels, and new holes drilled for the new fasteners. The repair work to the hanging knees was largely undertaken in June and July 2004, and they were reinstalled into the ship in November and December 2005.⁴⁶

By December 2004, most of the new framing was installed. The diagonal pointer timbers at bow and stern were removed in November 2004 for eventual replacement, and renewal of the thick ceiling planking began. The original thick ceiling comprised heavy 8-inch-thick planks up to 80-feet in length. The planks in each strake of ceiling were scarf jointed together and fastened to the frames with steel drift bolts. For additional strength, each strake was also edge fastened to the one below it with additional drift bolts. The project was able to replace the thick ceiling nearly in-kind, with 80-foot lengths of 8-inch fir planking through the middle of the hull. The fore and aft sections were replaced with double layers of 4-inch thick plank, following the original design. The pattern and amount of fastening was also reproduced. Thick ceiling replacement was completed in early May 2005.⁴⁷

Unlike the thick ceiling, the sheer clamp timbers could not be replaced with timber stock of the sizes originally used—the original construction

employed central timbers a remarkable 114 feet long and 14 x 12 inches in section. Such material could not be acquired. Instead, the project cut stock pieces of between 30 and 75 feet in length and scarf jointed them together. The clamp was lined off, fabricated, and installed in March and April 2005.⁴⁸

The hull planking was replaced with 4-inch thick fir, beginning in May 2005 and completing in January 2006. The layout of the original planking as well as the original fastening pattern had been carefully documented for replication, but the planking runs had to be adjusted to suit the widths of the replacement material. Steam bending was used to shape planks, particularly at the ends of the hull.⁴⁹

The deck beams were replaced, beginning in October 2005, except for main deck nos. 1 and 2 and nos. 35–41 under the afterhouse, and forecastle deck nos. 1–7. During disassembly, the vessel was found to lack a consistent deck camber along the length of the deck. A new camber of 3.5 inches was selected based on the existing curve in the beam at the forward edge of the afterhouse, which the team reasoned was likely to have remained close to its original shape. The arc for the camber was sawn into the top surface of each beam, the technique used in the original construction. The decision was made to allow the hold stanchions to press the deck beams up three-quarters of an inch at their center points, “just enough to tension the structure without putting too much strain on the fastenings holding the deck beam ends down to the sheer clamps.” Seventeen original hold iron stanchion brackets were retained, rehabilitated, and reused. Nine replica brackets were made and installed.⁵⁰ The cargo

⁴⁶ Canright, in “Rebuilding the C.A. Thayer,” 16, reports “about four” hanging knees were not reused; Jeffrey Morris, in comments to the author on a draft of this report, reported that just two were replaced. See also John Conway, email re: Thayer update July 04 (Continued), July 12, 2004, HDC 1632, folder 1.

⁴⁷ Canright, “Rebuilding the C.A. Thayer,” 14. Retained and replaced ceiling planks, as well as ceiling-plank scarf-joint locations, are documented in Bay Design and Engineering, “CA Thayer Ceiling Plank Stock

Optimization Schematic,” July 20, 2004, in HDC 1765, series 1.1.5.4, box 3, file 2, folder 3.

⁴⁸ Canright, “Rebuilding the C.A. Thayer,” 17; Bay Design and Engineering, “CA Thayer Clamp and Scarph Schematic,” August 12, 2004, in HDC 1765, series 1.1.5.4, box 3, file 2, folder 3.

⁴⁹ Canright, “Rebuilding the C.A. Thayer,” 17.

⁵⁰ Brian K. Lippert to Bill Elliott, November 4, 2005, HDC 1765, series 1.1.5.3, box 3, file 20, folder 4.

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hatches were returned to their original sizes, spanning four deck beams each.⁵¹

The original waterway timbers were 80 feet and more in length. To restore them, the park purchased long timber lengths, up to 120 feet. As the highest grade material was no longer obtainable in these sizes, the park purchased a lesser grade of timber. This compromise ended up being unworkable, and smaller, 42-foot lengths had to be purchased instead. This resulted in more scarf joints along the lengths of the waterways than had been necessary in the original construction. For maximum strength—and following original construction practice—the waterway timbers were sawn to shape from wider stock, instead of being steam bent, and they were notched to fit over the ends of the deck beams and into the bulwark stanchions. The new waterways were installed in October, November, and December 2005.⁵²

Restoration of the deck planking was accomplished using 4x4-inch Douglas fir planks in lengths of 40 feet. A bevel to accommodate the caulking was planed into one edge of each plank. The decking was installed beginning at the vessel's centerline and working outward to port and starboard. The work took from November 2005 to March 2006.

Caulking the seams in the deck and hull planking was done with traditional materials and traditional working techniques. In order to achieve the best results, John Hartford and another master caulker from Puget Sound were hired to train BSY's team in traditional techniques. All seams were filled with cotton and oakum, and then paid (finished) with an appropriate compound depending on location. Seams in the topsides were paid with a tar-like

seam compound and those below the waterline were paid with Portland cement. Seams in the deck were paid with marine glue. Caulking the hull began in December 2005; the deck, spring 2006.⁵³

Painting of the hull and bulwarks was done by hand with brush and roller to simulate a more authentic look and texture. Painting began in June 2006 and was completed in September. The main deck was scraped and oiled in May 2006.

Restoration of the afterhouse was not part of BSY's contract, but the house had to be moved out of the way to allow access to the hull area beneath it. The interior paneling and fittings in the house were dismantled and stored, and, at BSY's suggestion, the entire house and its supporting deck beams were lifted up as a single unit on steel I beams and supported on steel pillars while the hull was restored below it. The house was lifted in July 2004 and lowered back into position in October 2005. Pockets of rot required new starboard ends to be scarfed onto three of the beams under the house. The original deck planks were preserved inside the house.⁵⁴

By the mid 2004 it was clear that the amount of rehabilitation work needed in the hull exceeded original estimates. As a result, selected portions of the restoration work were held for completion later. The bulwark planking was funded from the Regional Cultural Resources program, and the rail cap, installed starting in September 2006, was funded from the park's Fiscal Year 2007 budget.

The *C.A. Thayer* was transported out of hanger to the BSY ship lift on March 22–23, 2007, and returned to the water on March 31. The vessel returned to Hyde Street Pier on April 10, 2007.

⁵¹ Canright, "Rebuilding the *C.A. Thayer*," 19.

⁵² Canright, "Rebuilding the *C.A. Thayer*," 19, 21; John Conway, email re: Thayer update July 04 (Continued), July 12, 2004, HDC 1632, folder 1.

⁵³ "Historic Vessel *C.A. Thayer*. Rehabilitation. Statement of Work," draft, December 12, 2001, in HDC 1765, subseries 1.1.5.3, box 3, file 12, folder 1; Canright, "Rebuilding the *C.A. Thayer*," 19, 21.

⁵⁴ Canright, "Rebuilding the *C.A. Thayer*," 19, 21; Bay Design and Engineering, "Beam Schematic update with removal notation," July 22, 2004, updated March 17, 2005, HDC 1765 digital files, series 1.2.1.1, file 2, //BSYContractSubmittalsDocs/Shop drawings/C.A. Thayer Deck Beam Schematics 050317 NPS.pdf. Canright says two beams under the afterhouse needed new ends scarfed on; the drawing identifies three.

TREATMENTS UNDERTAKEN 2007-2020

2007

Phil Erwin prepared a maintenance plan for the *Thayer* upon the vessel's return to Hyde Street Pier. This included a list of Douglas fir needed for restoration of the aft and forward houses in July 2007, although no restoration work was undertaken. The list specified 3,828 board feet for the aft house and 5,653 board feet for the forward house.⁵⁵

2008

Park photographs show that rehabilitation work to the exterior of the afterhouse was undertaken in summer 2008. The scope of this work is unclear.

2009

From 2009 to 2011, Jeffrey Morris restored the forward, aft, and starboard bulkheads of the afterhouse. Working from patterns and documentation created by Phil Erwin, Morris deconstructed the existing bulkheads one at a time and installed replacement logs shaped to duplicate the originals. He duplicated the original drift dimensions and patterns as well.

2011

The *Wawona*, the other surviving West Coast lumber schooner (also built by Hans Bendixsen and a near sister to the *C.A. Thayer*), was dismantled by its owner, the nonprofit educational organization Northwest Seaport, in March 2009. Two years later, SAFR was able to acquire components from the *Wawona* to replace missing and damaged equipment on the *C.A. Thayer*. These were:

- Rudder head clamp fitting
- Steering gear
- Port and starboard bilge pumps and one pump handle
- Bronze port light from forward deckhouse
- Windlass crosshead (not used aboard *Thayer* as did not match)
- Galley freshwater hand pump
- Rigging component and sail fragments to inform fabrication of new components for *Thayer*, including: blocks, sheet bails, boom end goosenecks, spar bands (hinged and unhinged), stay bails, sail hanks, parrel beads, shackles, spectacle irons, sail corner rings and thimbles, and sister hooks.⁵⁶

The *Wawona*'s capstan was also requested and granted, but the park did not end up taking it, as it proved to be of the wrong size and type for *Thayer*. The bronze port light from the *Wawona*'s forward deckhouse was acquired for use as a pattern to make new lights for the *Thayer*'s forward house, its form being considered by park staff to be more historically correct than those removed from the *Thayer*'s dismantled forward house.⁵⁷

In a justification for the acquisition of the *Wawona* components, park rigger Courtney Andersen wrote that "We feel it would be a dignified use of the historical *Wawona* artifacts to be able to complete the restoration of *C.A. Thayer* using gear from a sister-ship, of a similar era, and a similar origin. . . . We feel it is to the best practices and standards for historical vessel restoration to use items of a similar age and origin in replacement parts, rather

⁵⁵ C.A. Thayer Aft and Forward House Lumber Lists, July 5, 2007, HDC 1765, series 1.1.5.1, box 2, file 5, folder 1.

⁵⁶ Emmet Smith, email to Courtney Andersen, re: Wawona Proposal, January 13, 2011, HDC 1765 digital files, series 2.2, file 4, //data/Wawona pieces/Emmett Smith email.pdf; Jeffrey Morris to Robbyn Jackson and Steve Canright, [September 2011], HDC 1765 digital files, series 2.2, file 4, //data/Wawona pieces/Wawona Artifacts and Use.docx; "Wawona artifacts taken for C.A. Thayer project," HDC 1765 digital files, series 2.2, file 4,

//data/Wawona pieces/Wawona Artifacts for Thayer October 2012.docx. Deborah Bach, "Wawona aids in restoration of only remaining west coast lumber schooner," February 7, 2011, <https://www.threesheetsnw.com/wawona-aids-in-restoration-of-only-remaining-west-coast-lumber-schooner/>

⁵⁷ Craig Kenkel to Carol Rowland-Nawi, [December 2012], HDC 1765 digital files, series 2.2, file 4, //data/Wawona pieces/SHPO Wawona Parts.doc

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than fabricating new pieces or using parts that came from later, dissimilar vessels. It would bring *Thayer* as close as possible to her original condition”⁵⁸

2012

A scope of work for a planned yard period and haul-out was completed by the park in March 2011, but delays led to the contract for the work being awarded to Bay Ship and Yacht only in September 2011. The yard period took place between May and October 2012, and the work comprised:

- Fabricating, fitting, and installing missing sections of the lower sister keelsons and upper sister keelsons inside the hull
- Dubbing and fairing of futtocks in way of the thin ceiling
- Fabricating, fitting, and installing missing areas of the thin ceiling
- Fabricating, fitting, and installing pointers, four at the bow and two at the stern.
- Horsing the poop, main, and forecastle decks
- Drydocking the ship for hull cleaning and painting
- Repairing to hull planks as needed

- Reefing and recaulking hull seams and butts as needed
- Refit and installation of an NPS-fabricated rudder blank, reconditioning of the steering gear, and installation of gear and rudder.⁵⁹

This work was funded using \$1,096,988 from Fiscal Year 2011 funds and \$85,461 in Fiscal Year 2012 funds. The latter amount covered the work to the rudder and steering gear.⁶⁰

The park was unable to acquire ship plank-grade Douglas fir to complete the thin ceiling, as it was not available from any supplier, including the Hull-Oakes Lumber Company, which had supplied timber of that grade to the Defense Logistics Agency during the 2003–07 work. The park purchased Select Structural, Free of Heart Center grade Douglas fir to use instead.⁶¹

A rudder blank, originally created by park staff but not previously used, was shaped, fitted with hardware, coated, and installed by Bay Ship and Yacht. The *Thayer*’s original steering gear was too deteriorated to restore to working condition and so was replaced by the gear acquired from the *Wawona*. The original was retained in museum storage. BSY fabricated a new steering-gear box, which was installed over the gear on the poop deck.⁶²

⁵⁸ Courtney Andersen, “Proposal for using Artifacts and Material Salvaged from the Schooner *Wawona* for use on Reconstructed Schooner C.A. Thayer,” November 2011, HDC 1765 digital files, series 2.2, file 4, //data/Wawona pieces/Proposal for using Artifacts and Material Salvaged from the Schooner *Wawona* for use on Reconstructed Schooner C.pdf.

⁵⁹ “Technical Specifications for the Maintenance and Drydocking of the National Historic Landmark Schooner C.A. Thayer, Fiscal Year 2011, PMIS No. 163946,” February 25, 2011, HDC 1765 digital files, series 1.2.2, //data/Revised 03.7.11 Thayer SOW - With TOC rlj.doc; Solicitation, Offer and Award for contract no. P11Pc00165, June 13, 2011, HDC 1765 digital files, series 2.2, //data/SAFR-

Thayer_DD_Proj_CONTRACT.pdf. Other contract planning documents can be found in HDC 1765 digital files, series 1.2.2.2.

⁶⁰ Ibid.

⁶¹ [Jeffrey Morris], “C.A. Thayer Timber Quote Results,” December 24, 2011, in Jeffrey Morris Office Files, //FY 11 Drydocking Files/Written Timber Quote Summary.docx.

⁶² “C.A. Thayer PMIS 193-227,” [spreadsheet], May 15, 2012, HDC 1765 digital files, series 1.2.2, //data/Thayer Rudder IGCE.xlsx; “Fit Out and Install Rudder and Steering Gear on Schooner C. A. Thayer Statement of Work PMIS Project 193-227,” [May 2012], Jeffrey Morris Office Files, //FY 11 Drydocking Files/CA Thayer Rudder SOW.docx.

2014

The skylight atop the afterhouse was restored by Jeff Vallely in 2014.⁶³

In spring 2014, park staff completed a project scope and technical specification for rerigging the *Thayer*. Replacement of the vessel's rig had originally been planned as part of the 2003–07 rehabilitation, but lack of funding led the park to defer installing the vessel's masts, spars, and rigging. This delay had the unintended advantage of giving the park an opportunity to more closely investigate the form and details of the vessel's original rig. Historic Ship Rigging Supervisor Courtney Andersen began researching the *Thayer*'s historic rig in 2010, and completed the development of a revised *Thayer* rig design in January 2012. This 2012 design formed the basis for the 2014 project scope and specifications.⁶⁴

Andersen's research looked extensively in the SAFR collections, consulting historic photographs, documents, and drawings to reconstruct the vessel's rig as it appeared in 1895 when the vessel was new. Surviving construction contracts for West Coast lumber schooners from a number of builders revealed sail weights and the sizes of blocks and lines. Construction drawings from other Bendixsen-built schooners, particularly the 460-ton *Metha Nelson*, provided comparative information on the "rake of masts, proportional tapers, masthead dimensions, shroud spacing, gaff and boom lengths, and shape of gaff topsails" from which the details of *Thayer*'s historic rig could be extrapolated. The sizes and shapes of both metal and wood fittings for the rig were gathered from historic rig components in the SAFR collection, including items collected from the

Wawona and deadeyes and hearts from the *Thayer* that Captain Shields sold to Harold Huycke in the 1950s. Of particular interest to Andersen was "the hand-forged nature of the metalwork on the ship," which it was desirable to replicate in any new components.⁶⁵

The changes made to the *Thayer*'s rig to restore it to 1895 condition are summed up in description written by Andersen that appears in park correspondence:

C.A. Thayer underwent, as most long-lived sailing vessels did, many changes to her rig during her working life of 60-odd years. Built for the purpose of lumber trade along the Western coast of North America and occasionally to the Hawaiian Islands, she went aground in 1903. A series of photos was taken of her at this time [e.g. SAFR E3.8495n], and these are the earliest known, showing a great deal of detail of her probably-original rig. While she could have had changes done in the 8 years since her launch, comparisons of other sister ships show the same identifying details: spike bowsprit with a heavy chain inner bobstay and a lighter wire outer bobstay, gaff topsails, gaff topsail sheet chain fairleads, shrouds above her crosstrees, and finely tapered pole mastheads with spherical mast trucks.

A 1905 photo of her shows the same configuration; by 1915 a martingale and additional inner chain bobstay had been added, and her headsails reduced from three on the bowsprit to two, and she

⁶³ "Restore C.A. Thayer skylight," 2014, HDC 1765 digital files, series 2.2, //data/Project Review CA Thayer Skylight.doc.

⁶⁴ "Mast and Rig the Historic Three-Masted Lumber Schooner C. A. Thayer and Routine Dry-Docking and Maintenance, PMIS #174113 / PEPC #44103," April 28, 2014, HDC 1765 digital files, series 2.2, //data/Thayer Rigging-DRAFT 04-29-2014 JDM.docx.

⁶⁵ Courtney Andersen, email to Lisbit Bailey, re: CA Thayer drawings...the back story, December 30, 2014;

"C.A. Thayer Reference Parts" [list compiled by Andersen of rig components in SAFR collection]; Andersen, "Rigging the West Coast Lumber Schooner *C.A. Thayer*," all provided to the author by Courtney Andersen. The historic construction contracts were found in HDC 258, Hall Brothers Shipyard Vessel Contracts; spar lists and other information were found in HDC 259, Hall Brothers Shipyard Records.

now carried a square sail on the foremast; some photos from her lumber years seem to show a bowsprit and jibboom added, with three headsails; a 1928–1930 photo of her in the Bering Sea clearly shows a spike bowsprit with martingale, two heavy chain bobstays, and heavily patched sails; from 1942–1945 as a US Army barge, she had her masts removed; in 1945 she was purchased back by her previous owner, and the masts and bowsprit/jibboom from a larger topmast schooner (*Sophie Christenson*) were installed, though the topmasts were never rigged; in 1956 when she was purchased by the State of California, an attempt was made to shape the masts more in appearance with her rig when she was launched, but research has shown that the primary consideration in shaping those masts was reusing the metalwork from the larger masts of *Sophie Christenson*, thus they were not to the same proportions we see in the 1903 photos. From the 1957 restoration until the 2002 [sic] restoration, those wrongly-designed masts were duplicated whenever they rotted and needed to be replaced (in 1983 and 1998).

Based on the above research, evidence found in the papers of project leader Harold Huycke, in which he describes the compromises made on the 1957 masting, and from the spar plans of Bendixsen's sister ships, we have had a revised rigging plan prepared. This shows the historically correct dimensions, taper, and rake of the masts, dimensions of the gaffs and

booms, and standing and running rigging layout and dimensions.”⁶⁶

2015 Rig restoration begins

The existing gangway was replaced with a new aluminum truss gangway during 2015. Shipwright Charter Kays fabricated a wood landing and stairs to connect the aluminum gangway and boarding platform⁶⁷

Restoration of the *Thayer's* rig began in 2015, through a contract again awarded to Bay Ship and Yacht. Work began with fabrication of new masts, spars, and associated ironwork at BSY. The park did have two unused replacement timber masts acquired prior to the 2003–2007 work but decided after structural analysis not to use them. Instead, it opted to use laminated or “built” masts, described in planning documents as “engineered marine grade structural glued laminated timber beams,” made by Sentinel Structures. This allowed greater quality control of the strength and structural integrity of the masts, and simplified and shortened the process of acquiring such large poles. BSY shaped the new masts and spars between August and October 2015.⁶⁸

The new mast trucks and parrel beads, originally specified to be grey ironbark following typical nineteenth-century practice, were made from *lignum vitae* in the end due to the unavailability of ironbark in the United States.⁶⁹

On October 15, 2015, the *Thayer* was moved to BSY for haul-out and hull cleaning and painting. Damage from marine borers was discovered in some hull planks, the aft deadwood, the rudder, and the worm shoe aft. Repairs to first two areas were covered by the park's original contract with BSY, but a contract modification was necessary to

⁶⁶ Craig Kenkel to Carol Roland-Nawi, May 3, 2013, HDC 1765 digital files, series 2.2, //data/SHPO_Thayer Rigging_Supt Signed 3May13.doc.

⁶⁷ “National Historic Landmark Schooner C. A. Thayer Aluminum Truss Gangway and Support Platform,” HDC 1765 digital files, series 2.2, //data/CA Thayer Gangway Project Specifications.doc.

⁶⁸ Craig Kenkel to Carol Roland-Nawi, May 3, 2013, HDC 1765 digital files, series 2.2, //data/SHPO_Thayer

Rigging_Supt Signed 3May13.doc. Photographs of the masts being shaped are in Jeffrey Morris Office files, //FY14-16 Drydock-Rigging Files.

⁶⁹ “Justification, Mod 004 — Additional Caulking and Material Substitutions,” November 12, 2015, Jeffrey Morris Office files, //FY 14-16 Drydock-Rigging Files/Administration/MOD 004/CAT15 MOD 004 Justification 11-12-2015.docx

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fund repairs in the last two areas and to apply a third coat of antifouling paint to the entire underbody of the vessel to help prevent further damage before the next yard period.⁷⁰

During November and December, new bull rails, bull rail cap, stanchions and taffrail were installed around the poop. Anchor lining planks were added to the outside of the bulwarks on either side of the bow. At the same time, new chain plates were fabricated and installed athwart the mast locations, new catheads installed, and the gammoning knee, including fiddlehead, was fabricated, decoratively carved, painted, and installed. The decorative carving was based on new analysis of historic photos. The new bowsprit was stepped December 24, 2015, and the ship returned to the water January 6, 2016.

2016

The new masts were stepped aboard the *Thayer* at Bay Ship and Yacht. Preparatory work included cutting a mast step for the foremast and repairing the mast steps for the main and mizzen; and cutting circular openings through the deck planking and mast partners to allow all three masts to pass. The foremast was stepped first, on January 29, then the main and mizzen on February 1, 2016. An 1895 silver dollar minted at San Francisco was placed under the heel of the foremast. A San Francisco 1895 gold Liberty Head \$10 piece was placed under main. An 1895 penny, a 2016 quarter, and three commemorative NPS pins were placed under the mizzen. New fife rails were installed along the bulwarks and the shrouds partly set up before the *Thayer* was towed back to Hyde Street Pier on February 22.⁷¹

Additional work planned but not funded during the 2015–16 yard period included:

- Fabrication and installation of lumber chute hatches
- Installation of bilge pump
- Carving of name and home port onto transom
- Installation of boat davits
- Replacement of capstan
- Restoration and installation of windlass⁷²

The final overall cost of the 2015–16 work was \$2,288,595.⁷³

2017

With the vessel remaining at Hyde Street Pier, park riggers and shipwrights rigged the gaffs and booms with their peak halyards, throat halyards, and sheets.⁷⁴

Restoration work on the afterhouse resumed after the *Thayer* returned to Hyde Street Pier. The windows were installed and the slide shutters restored between 2017 and 2018.

2018

During the summer, park staff spliced the deadeyes to the shrouds on all three masts and served the lower sections of the shrouds. They also rigged the headsails to the stays along with the required running rigging. They applied slush and tar to all rigging as a preservative measure, following historic practice. Canvas mast-boots

⁷⁰ "Justification. MOD 005 – Rudder and Worm Shoe Repair and 3rd Coat of Antifouling Underwater Hull Paint," December 21, 2015, Jeffrey Morris Office files, //FY 14-16 Drydock-Rigging Files/Administration/MOD 004/CAT15 MOD 005 Justification 12-21-2015.docx.

⁷¹ The 2015–16 yard period is documented in photographs filed in Jeffrey Morris Office Files, //FY 14-16 Drydock-Rigging Files/Photos. Information on the coins placed under the masts provided by Courtney Andersen.

⁷² "NHL Schooner C.A. Thayer Spending Program for FY2015 to FY2017," Jeffrey Morris Office Files, //FY 14-16 Drydock-Rigging Files/Administration/C.A. Thayer Spending Plan jdm 04.01.2017.xls.

⁷³ "C.A. Thayer P15PC00032," Jeffrey Morris Office Files, //FY 14-16 Drydock-Rigging Files/Administration/Mods and Invoices 5-2-17.xlsx.

⁷⁴ Courtney Andersen, email to author, February 10, 2020.

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were fabricated and installed to cover the masts where they pass down through the deck.⁷⁵

2019

By 2019, the rigging was essentially complete, although staff under the direction of Historic Ship Rigging Supervisor Courtney Andersen continued to complete a variety of important details while keeping up with a program of maintenance. For example, during the summer, the staysail boom topping lift was rerigged based on new analysis of historic photos. The davits were rigged and painted. Staff serviced all blocks by removing them, taking them apart, and soaking them in a mixture of pine tar and linseed oil. The spars were also slushed with this mixture and the service received two coats of Stockholm tar.

During 2019 the original interior paneling in the afterhouse was reinstalled; this work continues in 2020.⁷⁶

2020

At the time of writing, planning is in an advanced stage for a haul-out and yard period during 2020. A significant number of outstanding details of the *C.A. Thayer's* restoration are planned:

- Haul-out for cyclical maintenance of the hull, including hull planking and worm shoe repairs, cleaning, and painting.
- Replication and installation on lead draft marks on stem and sternpost port and starboard
- Restoration of hatch covers for the lumber port openings through the transom. Fabrication of louvred ventilation hatches for alternative use in the chute openings.
- Reconstruction of lumber loading platform in the hold aft

- Reconstruction of chain locker at bow in hold
- Installation of about 25 feet of new salt box in the hold
- Repair and replacement of areas of the bull rail
- Replacement of the end grain with graving pieces where the transom beam has deteriorated
- Painting of the steering wheel and steering-gear box
- Carving of name, homeport, and decorative scroll on transom
- Restoration of the forward deckhouse
- Restoration and reinstallation of galley stove
- Restoration and reinstallation of windlass⁷⁷

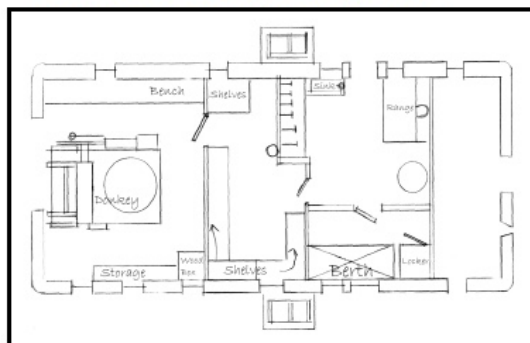
Among the most significant and long-planned components of this round of work is the restoration of the forward deckhouse. It had long been known that most of the forward deckhouse was built in the 1940s, with only the forward-most six feet being original. These six feet were retained in 2003 while the rest was dismantled and disposed of. The park's plan, had funding extended to restoring the deckhouse in 2006–07, had been to return it to its original external dimensions and configuration but to reconfigure the interior to accommodate an enlarged gallery better suited to the needs of the environmental living program for children.

⁷⁵ Courtney Andersen, email to author, February 10, 2020.

⁷⁶ Courtney Andersen, email to author, February 10, 2020.

⁷⁷ "Dry-Docking and Maintenance of the National Historic Landmark Three-Masted Lumber Schooner C. A. Thayer, Project Scope and Technical Specifications," May 1, 2019, Jeffrey Morris Office Files, //FY19-20 Dock Files/A04 SOW Final 05-01-2019 JDM.docx.

Deckhouse: Existing Configuration



Deckhouse: Preferred Configuration

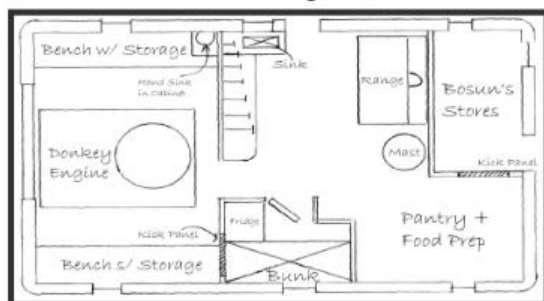


Figure 11.1. Plans from the 2002 Environmental Assessment (not to scale)

This plan was revised in 2015 and 2016 in favor of a more historically accurate internal layout, reconstructed from the following evidence found in the SAFR collections:

- A 1911 deck plan for the Bendixsen-built *Metha Nelson*, a sister vessel to the *C.A. Thayer*, documents that vessel's forward house.
- An interview with *Thayer* captain Ole Lee describes the configuration of the deckhouse.
- Park staff discovered a line of fastening holes in the original deck that indicated the position of the

fore-and-aft bulkhead dividing the galley from the cook's cabin and the historic position of the forward galley bulkhead.

- Surviving crew lists indicate the need for six bunks in the forecabin.
- Original plans by Hans Ditlev Bendixsen of similar lumber schooners show similar layouts.⁷⁸

The revised plan calls for partitioning the deckhouse into four compartments, a forecabin with six berth forward, a galley and cook's room in the middle, and a donkey engine room aft. Construction details for the house's structure and external cladding have been extrapolated from the surviving original six feet of the house, Bendixsen drawings in the SAFR collection, drawings published in the *Historic American Merchant Marine Survey*, and historic photos of schooners under construction at Bendixsen's yard.⁷⁹

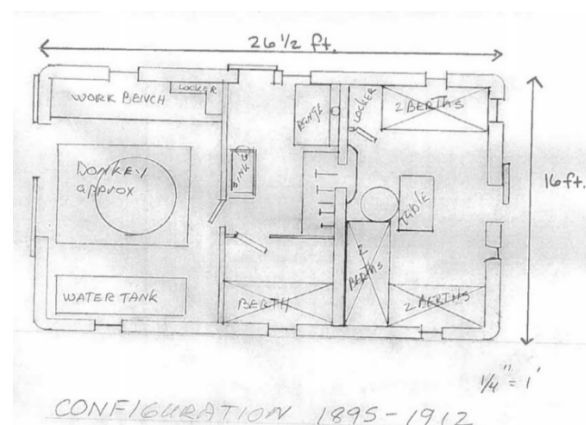


Figure 11.2. 2016 reconstruction based on *Metha Nelson* and other evidence

⁷⁸ Kevin Hendricks to Julianne Polanco, March 18, 2016, HDC 1765 digital files, series 2.2, //data/SHPO CA Thayer Forward House (3-18-16).doc.

⁷⁹ Melvin H. Jackson, *The Historic American Merchant Marine Survey: a Works Progress Administration Federal Project for the Watercraft Collection of the Smithsonian Institution* (New York: Ayer, 1983). The Bendixsen yard photos, by photographers Shaw and

Lambert, appear in Melville M. Vaughan, "A California Principality: Humboldt and Its Redwoods," *Overland Monthly and Out West Magazine* 28:165 (September 1896), 353–55. Bendixsen schooner plans consulted in the SAFR collection include S.T. Alexander, *Alvena*, *Borealis*, *Necanicum*, James H. Bruce, James Rolph, R.W. Bartlett, *Irene*, and *Metha Nelson*. These plans are not yet cataloged.

SUPPLEMENT: TREATMENTS UNDERTAKEN 1957-2003

Between 1957, when the *C.A. Thayer* was acquired for museum use, and the start of full rehabilitation in 2003, the vessel underwent a series of partial restoration and preservation treatments and extensive routine maintenance, including being hauled out for bottom cleaning, repairs, and painting nineteen times. This supplement presents a chronological summary of the work done over this 46-year period. Although the physical results of this work have now almost entirely been swept away by the 2003–2007 restoration, their documentation is important to trace how the ship was cared for over time, and how preservation and maintenance practices changed.

1957

The California State Department of Natural Resources, Division of Beaches and Parks purchased the *C.A. Thayer* in Washington state in 1957 for use as a museum ship in San Francisco. The vessel as collected had last had extensive hull repairs in 1942. Its rig was installed in 1946, when owner Captain J. E. Shields took three four-year-old masts, the standing rigging, and the headgear from the schooner *Sophie Christenson* and moved them to the *Thayer*. An extensive program of restoration and renewal was required to make the *Thayer* seaworthy for its journey to San Francisco.

⁸⁰

At the time of purchase, the *Thayer* lay in a gravel berth at North Lilliwaup, Washington, on the Hood Canal. It was towed to Seattle in February 1957 for drydocking and initial restoration at the Lake Union Drydock Company's yard on Puget Sound.⁸¹ Additional restoration was carried out at the Maritime Shipyards Company in Ballard starting in

May, and work to masts, spars, and rig was done by the Commercial Ship Repair Company, in part at Pier 56 in Seattle. Captain Harold D. Huycke Jr. directed the work in Washington, assisted by Captain A. F. Raynaud and in consultation with Karl Kortum and others at the San Francisco Maritime Museum. According to the museum's 1959 report on the work, "The Seattle program was designed to place the vessel in seaworthy condition for a comparatively short summer or fall voyage, but at the same time future maintenance and display problems were carefully considered. The work, once underway, led to further restoration, for long-term economy frequently dictated carrying out more extensive repairs than those originally contemplated."⁸²

Once in seaworthy condition, the *C.A. Thayer* made the passage from Seattle to San Francisco in late September and early October 1957. The work accomplished to allow the vessel to sail comprised:

Hull

- Repaired 30-feet of keel from forefoot running aft
- Replaced 11-feet of the forecastle sheer strake on the port side
- Replaced 83-feet of bottom planking on the starboard side
- Repaired keel from forefoot to 30 feet aft
- Recaulked about 3,600 running feet of seams
- Topsides sandwashed and painted
- Bottom painted

Forecastle head

HDC 1600, series 3.19, box 203, folder 3 (duplicate copies in HDC 649, series 5, box 28, folder 18 and HDC 648, series 12, box 8, folder 7).

⁸² San Francisco Maritime Museum, The Schooner *C. A. Thayer*: Reports I–III to the State of California Division of Beaches and Parks, on the History and Restoration of the *C. A. Thayer*, March 1959 [hereafter cited as **Thayer Reports I–III**], 16, 18.

⁸⁰ For the *Thayer*'s condition at time of acquisition, see A. F. Raynaud, "Schooner C. A. Thayer Survey Notes, Hood Canal," February 4–6, 1957, and "C. A. Thayer Survey Notes, Lake Union Drydock Co. Yard," February 21, 1957, both in HDC 1598, box 1, folder 5.

⁸¹ Lake Union Drydock Company, Work Order for Job no. 125, February 21, 1957; Work Orders for Job no. 147, March 27, 1957, and subsequent dates, originals in

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- Replaced bull rails and sections of rotten covering board on forecastle head
- Replaced catheads and pawl bitts
- Replaced deck beam at the forecastle break and sister beam forward of pawl bitt
- Replaced decking in way of pawl bitt
- Replaced idler gears in capstan with new castings

Stern

- The wheelhouse on the stern from the *Thayer's* codfishing period removed
- Horseshoe timbers to port and starboard and across the stern replaced together with their knees
- Installed one new frame and three sister frames at port and starboard quarters
- Installed six new frames and four sister frames in transom
- Installed a sister beam for main poop beam
- Removed one deck beam and cut off deteriorated ends of other deck beams and installed angle supports
- Replaced 119-feet of transom planking
- Replaced 136.5-feet of planking on starboard quarter
- Replaced 66 feet of planking on port quarter
- Replaced 464 feet of decking aft
- Replaced covering board, bull rail, stanchion rail, and cap rail around stern
- Installed new bitts on starboard quarter
- Wheelbox reconstructed

- Brass wheel from the codfishing period removed and replaced by a cast-iron wheel salvaged from the schooner *Azalea*.

Rig

- New bowsprit and masts stepped
- New fore gaff and boom installed
- Existing ironwork and rigging reused where possible
- Spanker sheet horse from schooner *Beulah* installed at stern

Machinery

- Renewed anchor windlass support timbers
- Anchor windlass and gasoline donkey engine put in running order
- Anchor chains cleaned and sprayed with asphalt.
- Pins, shackles, and links for anchors replaced or repaired.⁸³

The masts and bowsprit from the *Sophie Christenson* that the *Thayer* carried at the time of purchase came with were found to be rotten, so new masts and bowsprit were ordered from the Spar Manufacturing Company of Seattle. While the vessel's original bald headed appearance with spike bowsprit was replicated, the dimensions of the new masts were dictated by a desire to economize by reusing the *Sophie Christenson's* ironwork, fore and main lower shrouds, outer and inner jib stays, and forestay. The masts were fitted with new trestles and crosstrees, but the old booms and gaffs were retained except on the foremast. The mizzen remained jib-headed without its gaff being reinstated. Turnbuckles were used on the shrouds and backstays instead of the

⁸³ HSR, 20; Thayer Reports I-III, 17; Lake Union Drydock Company, Work Orders for Jobs nos. 125 and 147; A. F. Raynaud, "Survey Notes on Rigging, Schooner C. A. Thayer, at Maritime Shipyards, Seattle" [rigging specifications], June 1, 1957, HDC 1598, box 1, folder 5.

Additional detailed contract and specification documents for the work carried out by Lake Union Drydock Co. and Maritime Shipyards Co. are filed in HDC 1600, series 3.19, box 203, folders 7, 10, and 14.

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deadeyes and lanyards that the vessel carried originally.⁸⁴

The last sails the *Thayer* had used in service come from the schooner *Charles R. Wilson*; Huycke and Raynaud purchased these and others from Ed Shields (a son of Captain J. E. Shields) for use on the *Thayer's* delivery voyage to San Francisco.⁸⁵

1958

After arriving in San Francisco in October 1957, the *C.A. Thayer* initially lay at Angel Island State Park before being towed to Oakland to await further work. The San Francisco Maritime Museum continued, under contract, to advise California Parks on the restoration and interpretation of the vessel. Ten months after the delivery voyage, the *Thayer* was drydocked in August 1958 at Moore Dry Dock Company. Workers burned out and plugged worm holes in the bottom planking and applied two coats of copper paint to the bottom. Steel gasoline and water tanks installed during the codfishing period were removed from hold. The hog in the keel was measured at 8.5 inches⁸⁶

A proposal to protect the bottom planking with redwood sheathing laid over Irish felt was not taken up due to cost constraints.⁸⁷

Total expenditures for the acquisition and restoration of the *Thayer* by the end of 1958 were:

Purchase	\$27,061.83
Special consultant fees	\$5,857.70

Travel	\$2,114.05
Salary and wage encumbering document	\$3,384.00
Rehabilitation	\$93,959.72
Total	\$132,377.30 ⁸⁸

1959

An infestation in the hold of wharf-borer beetles, first noted in spring 1958, was treated in May 1959 with commercial insect bombs and spray application of pentachlorophenol solution.⁸⁹

A wood water tank was installed along the starboard side of *Thayer's* forward deckhouse. This was one of two the San Francisco Maritime Museum acquired in December 1958 from Arques Shipyards off the schooner *Beulah*.⁹⁰

A connecting overhang between the forward deckhouse and the forecastle head was removed in September 1959.⁹¹

The *Thayer* was hauled out at Martinolich Ship Repair Company in the fall. The bottom was cleaned, repaired for worm damage where necessary, and painted. Sections of the keel shoe were replaced. The draft numbers were painted at bow and stern.⁹²

Restoration of the interior of the afterhouse began during 1959 and continued in 1960. The cabin's interior arrangement had been altered during the vessel's working life, but the original layout was

⁸⁴ HSR, 20; Courtney Andersen, "Rigging the West Coast Lumber Schooner *C.A. Thayer*."

⁸⁵ HSR, 20. The final remaining three of the *Thayer's* 1957 suit of sails (foresail, mainsail, and mizzen) survived until November 1985, when they were disposed of; see Stephen Hastings, memo to file re: *C.A. Thayer's* Sails, November 21, 1985, HDC 648, series 12, box 7, folder 5. Dimensions of the sails are preserved with the memo.

⁸⁶ *Thayer* Reports I–III, 19; HSR, 22.

⁸⁷ *Thayer* Reports I–III, 18–19.

⁸⁸ "Department of Natural Resources, Division of Beaches and Parks, Old Ships, Expenditures as of

December 31, 1958," in HDC 649, box 28, series 5, folder 18.

⁸⁹ Roger Olmsted to Lloyd Lively, June 2, 1959, HDC 648, series 12, box 8, folder 10.

⁹⁰ Receipt from San Francisco Maritime Museum to California Department of Natural Resources for removal of two wooden water tanks from schooner *Beulah* in December 1958, January 6, 1959, HDC 648, series 12, box 7, folder 2.

⁹¹ Harry Dring Photographs, P91-015, series 3, box 16, folder Album *Thayer* 1.

⁹² HSR, 22; Martinolich Ship Repair Company, Work Order for job no. 2279, June 17, 1959, HDC 648, series 12, box 8, folder 7.

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determined from physical evidence in the structure and the recollections of Captain Ole Lee. The cabin was mostly restored to its original layout, with the change that two short halls by the fore and aft entrances were connected to form a passageway through the cabin, for improved visitor circulation.⁹³

The cabin restoration involved:

- Removing the reefer box from the pantry compartment
- Renewing beam ends and margin piece on starboard side of cabin overhead, due to rot (July 1959)
- Rebuilding cabin overhead deck (July and August 1959)
- Rebuilding sliding port covers
- Fitting new window sash in skylight
- Moving bulkheads to nearly reconstruct the cabin's original layout
- Relocating or replacing moldings where required by wall moves
- Rehangng surviving original interior doors
- Fabricating four replica doors
- Cutting additional scrollwork vents for saloon (September 1959)
- Striping of paint from interior paneling
- Faux finishing of interior walls in the master's cabin and saloon (May 1960)
 - Furnishing the compartments for museum display⁹⁴

Simulated oak graining was found to be the earliest finish on the redwood paneling in the master's cabin and the saloon. New graining was applied to these surfaces by decorative painter Peter Licin of San Francisco.⁹⁵

1960

Planning documents by restoration and maintenance supervisor Harry Dring from October

1959 and March 1960 list ongoing and planned work needed to make the *Thayer* ready for public display. The work summarized in these lists comprised:

Hull, deck, and hold

- Painting of hull, sheer stripe, boot top, and stern; pinrails, waterways, deckhouse exterior, donkey room interior, forward end of afterhouse, taffrail
- Replacing the port bull rail (February 1960)
- Installation of electrical system
- Rebuilding main-hatch coaming
- Fabricating main-hatch gratings (May 1960)
- Fabricating and installing ladders and platform in forward hatch to allow public access to hold
- Repairing deck under capstan
- Making and installing canvas mast boots and wheel cover
- Making and installing fiddlehead, carving and painting decorative scrollwork (June 1960)
- Installing staysail boom and stanchion (July 1960)
- Fabricating and installing wire screen barriers at doorways to boatswain's locker, galley, master's cabin, and mate's cabin.

Forward deckhouse

- Removing toilet room
- Removing ladder into fishermen's forecandle and decking over opening
- Making and installing five paneled sliding doors

⁹³ San Francisco Maritime Museum, *Schooner C. A. Thayer: Cabin Restoration*, March 1960, 1.

⁹⁴ *Schooner C. A. Thayer: Cabin Restoration*, 1, x. Dates, where given, were are taken from Harry Dring

Photographs, P91-015, series 3, box 16, folder Album Thayer 1.

⁹⁵ *Schooner C. A. Thayer: Cabin Restoration*, 4.

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- Installing tongue and groove bulkheads
- Creating skylights for fishermen's to port and starboard (June 1960) ⁹⁶

Harry Dring and others involved in the *Thayer's* restoration recognized that the forward deckhouse was not original except for the forwardmost portion and recommended that the entire house be replaced. "Since the forecastle has been altered so much and had so many soft spots," Dring wrote, "and since the new part of the house is so poorly constructed and totally lacking in style, none of the deckhouse is worth saving in the long run." A deck plan dated May 11, 1960, shows the *Thayer* with the "deckhouse and forehatch restored," but this work proved too expensive to undertake, and Dring suggested that "as little as possible should be spent on this structure—as little as is consistent with presenting an adequate display. New installations, such as sliding doors and window cover, should be removable wherever possible. Donkey equipment, workbench, bunks, etc. need not be nailed down too firmly." ⁹⁷

A boiler winch, a steam-operated pump (described in receipts as a "ship's doctor"), a riveted steel fresh water tank, and two bollards were acquired off the schooner *Beulah* from the Arques Shipyards in early 1960. The pump was installed into the donkey room of the deckhouse in May

1960. The tank may have been installed in the donkey room around the same time, although it was later installed outside the deckhouse on the starboard side. Installation of the winch and bollards is not documented. The project also acquired two paneled interior doors from *Beulah* in 1960, which were installed inside the deckhouse. ⁹⁸

1961

The California Electric Company installed an electrical system aboard *Thayer* early in 1961. ⁹⁹

The *Thayer* was hauled out at Martinolich Ship Repair Company for hull cleaning and painting. About 50 feet of keel shoe were replaced, and the mizzen crane iron repaired. ¹⁰⁰

1962

The *Thayer* was again hauled out, this time at Bethlehem Steel, for hull cleaning and painting. About 1,500 feet of seams in the hull planking were reefed, caulked, and cemented. ¹⁰¹

1963

A surviving specification document and photographs document a haul out in January 1963, but the name of the shipyard for the drydocking has not been identified. The work comprised routine hull cleaning and painting, renewal of about five feet of keel shoe, straightening the stock on one anchor and sandblasting and painting

⁹⁶ Harry J. Dring, C. A. Thayer Work Outline, October 20, 1959, HDC 684, series 12, box 8, folder 10; Dring, memo to Superintendent, District 4, re: Schooner C. A. Thayer — "Master Plan" for Display, March 3, 1960, HDC 648, series 12, box 7, folder 2. Dates, where given, are taken from Harry Dring Photographs, P91-015, series 3, box 16, folder Album Thayer 2.

⁹⁷ [Harry Dring], "C. A. Thayer Restoration Projects," [1959?], HDC 648, series 12, box 8, folder 10; San Francisco Maritime Museum, "Thayer Deck Plan," May 11, 1960, HDC 555, series 1.3, file 5, item 1737.05.

⁹⁸ Purchase of the winch, pump, steel water tank, and bollards documented in D. J. Arques to Maritime Museum, August 18, 1960, HDC 648, series 12, box 7, folder 2. (A captain's bunk with drawers from schooner *Azalea* was acquired from Arques at the same time;

these do not appear to have gone into *Thayer*.)

Purchase of the interior doors is mentioned in Harry Dring to W. A. Lloyd, December 10, 1969, HDC 648, series 12, box 8, folder 12. Date of installation of the winch from Harry Dring Photographs, P91-015, series 3, box 16, folder Album Thayer 2.

⁹⁹ California Department of Natural Resources Service Agreement Transmittal with California Electric Company, November 3, 1960, and Division of Beaches and Parks Authorization for Payment of Invoices to California Electric Company, March 23, 1961, both in HDC 648, series 12, box 8, folder 10.

¹⁰⁰ HSR, 22.

¹⁰¹ California Standard Agreement with Bethlehem Steel Company, August 30, 1962, HDC 648, series 12, box 8, folder 11.

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both anchors, and unshipping the spanker boom and stowing it on deck.¹⁰²

A martingale was installed on the bowsprit in May 1963. The reason for altering the bowsprit rig with this addition is not documented.¹⁰³

A rolltop desk and two chairs were purchased in June 1963 to further furnish the afterhouse.¹⁰⁴

The *C.A. Thayer* opened to the public at Hyde Street Pier, along with other vessels in the San Francisco Maritime State Historic Park, on October 2.

1965

The *Thayer* underwent routine bottom maintenance in drydock at Bethlehem Steel in the spring.¹⁰⁵

1966

The *Thayer* was drydocked for bottom maintenance in August at Martinolich Ship Repair Company.¹⁰⁶

1969

A yard period from October to December 1969 included significant replacement of deteriorated structural timbers in the bow, as well as drydocking for routine hull maintenance. The bow renewals comprised removing twenty strakes of planking below the sheer strake along the forward 40 feet of the bow, port and starboard, to expose the stem, deadwood, and frames underneath. Rotted sections as well as whole structural components were renewed with dense select

structural Douglas fir. New lumber was used in frames, ceiling, apron, stem, stem deadwood, clamp, deck beams, and topside planking. All new structural wood was treated with pentachlorophenol as a preservative. Steel gusset knees were installed between the ceiling planking and a new deck beam abaft the hawse pipes to provide additional stiffening. These renewals were intended to strengthen the bow so the hawse pipes could continue to be used to run mooring lines for the vessel.¹⁰⁷

1972

The *Thayer* entered drydock at Merritt Ship Repair Company in Oakland in February and returned to Hyde Street Pier March 24. Fourteen hull planks were replaced on the port side, 95 feet of keel shoe were renewed, and repairs were made to the windlass brakes, including fabrication of two new windlass break handles. The hog in the keel was measured at 9-5/8 inches.¹⁰⁸

1975

The park contracted for a yard period and haul-out for the *Thayer* at Merritt Ship Repair Company during September and October. The previous spring, while contracting for this yard period was underway, the *Thayer* had developed a leak estimated at between 600 and 800 gallons per hour. Harry Dring and his crew installed a backup pump in the hold to supplement the permanent pump. The leak developed to 900 gph by the time of drydocking.¹⁰⁹ At the yard, 367 feet of hull planking and sections of the keel show were replaced. A new galley stove and flue were

¹⁰² "Schooner 'C. A. Thayer,' 20-5897 Drydocking and Miscellaneous Repairs," January 10, 1963, with modifications, HDC 648, series 12, box 8, folder 11.

¹⁰³ Harry Dring Photographs, P91-015, series 3, box 16, folder Album Thayer 4.

¹⁰⁴ San Francisco Maritime Museum, memo to Colin Chambers, re: Desk Purchase, June 29, 1963, HDC 648, series 12, box 8, folder 16.

¹⁰⁵ Contract documents for 1965 drydocking in HDC 648, series 12, box 8, folder 12.

¹⁰⁶ Contract documents for 1966 drydocking in HDC 648, series 12, box 8, folder 12.

¹⁰⁷ "Specifications for San Francisco Maritime State Historic Park Drydocking and Bottom Maintenance Schooner C. A. Thayer, 68-434-1A," January 1969; Harry J. Dring to W. A. Lloyd, October 27, 1969; Dring to Mr. Frincke, November 26, 1969, all in HDC 648 series 12, box 8, folder 12.

¹⁰⁸ HSR, 22; "Specifications for San Francisco Maritime State Historic Park Drydocking and Maintenance Schooner C. A. Thayer, 5-223-53-720," October 1971, HDC 648 series 12, box 9, folder 21.

¹⁰⁹ Harry Dring to Ted Crane, April 18, 1975; Dring to Charles Lyden, November 20, 1975, both in HDC 64, series 12, box 9, folder 21.

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installed. Sections of the stern bull rail, caprail, and covering board were renewed. A Murray Brothers donkey engine and boiler, the gift of the Pacific Gas and Electric Company, were installed in the donkey room, after which the deckhouse roof was renewed and altered to include a raised trunk over the top of the boiler. Thirteen inches of hog were measured in the keel.¹¹⁰

1979

Another severe leak developed in the *Thayer's* hull in November 1978. Despite patches installed by divers, the leak rate increased. Harry Dring reported on December 1 that 36,000 gallons had been pumped out over a six-day period. A contract for emergency drydocking was awarded to Merritt Shipbuilding Company, and the *Thayer* was hauled out in January 1979. About 150 feet of hull planking was replaced and 400 feet of seams caulked. Along with cleaning the underwater body and repainting the hull, workers installed Irish felt and Chemonite-treated plywood panels over the entire underwater surface of the vessel. About 42 feet of starboard rail cap in way of the gangway platform and about 14 feet of rotten coaming on the port side of the deckhouse were also replaced.¹¹¹

1980

The *Thayer* was hauled out at Merritt Shipbuilding in Oakland during January and February. Extensive rot was discovered in the deck, upper frames, deck beam ends, and covering boards, as well as worm

damage in the hull planking. Fourteen inches of hog were measured in the keel.¹¹²

1981

In the spring, a severe pocket of rot was discovered in the mizzen mast near the hounds. Additional surveys found rot in the fore and main masts as well. None of the masts were removed at this time.¹¹³

The stern offshore anchor chain parted during a storm in January, causing the *Thayer* to chafe against the pier. About 20 square feet of hull planking (6 planks) on the starboard side was damaged.¹¹⁴

1982

The bow anchor chain parted during a winter storm, leading to damage to eight more planks amidships on the starboard side.

A survey conducted in October found that the top 10 feet of the main mast and the top 15 feet of the foremast were "severely deteriorated." New masts were ordered. The mizzen mast was removed October 27, 1982.¹¹⁵

1983

The *Thayer* underwent a three-month yard period at Pacific Drydock and Repair Company in fall 1983, returning to Hyde Street Pier in January 1984. The fore and main masts and bowsprit were removed, and three new masts and a new bowsprit stepped and rigged with existing rigging. The masts were shaped to measurements made

¹¹⁰ HSR, 22; "San Francisco Maritime State Historic Park Drydocking and Maintenance Schooner C. A. Thayer, Special Provisions," [January 1975], and Department of Parks and Recreation, Standard Agreement 4-792-6047 with Merritt Ship Repair Co., July 7, 1975, both in HDC 648, series 12, box 9, folder 21; "Schooner C.A. Thayer LCS Supplement Sheet," January 1978, HDC 648, series 12, box 7, folder 3; "The C. A. Thayer's Donkey Engine," n.d., HDC 1084, series 1, subseries 2, box 26, folder Donkey Engine.

¹¹¹ HSR, 24. Harry Dring, memo to William Mote, re: C. A. Thayer Dry-Docking, December 1, 1978; "Specifications for Bottom Maintenance and Other Repairs to Historic Schooner C.A. Thayer . . . IFB no.

8140-79-03," [1979]; Robert G. Hartsock to Harry Dring, December 12, 1978, all in HDC 648, series 12, box 9, folder 22.

¹¹² HSR, 24; Lally, Hubenette, Jessie, Fay & Associates Marine Surveyors, survey report dated December 26, 1980, HDC 648, series 12, box 8, folder 16; "A Legacy of Wood," *Sea Lanes* (June 1980).

¹¹³ Stephen Hastings, "Restoration of the C. A. Thayer, 1983," *Sea Letter* (winter 1984/85), 13.

¹¹⁴ HSR, 24.

¹¹⁵ Hastings, "Restoration of the C. A. Thayer," 14, 17; Bruce Cibley, Hull and Cargo Surveyors, Inc., to Steve Hastings, October 13, 1982, HDC 1765, series 1.1.1, box 1, file 1.

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from the old masts. Existing fittings were removed and reused or replicated. The hog in the keel was measured at 14 1/4 inches. The ship was drydocked and 600 feet of new planking was installed on the starboard side to repair the hull damage from the 1981 and 1982 storms. Selected frames were also renewed in way of the new planking.¹¹⁶

It had not originally been planned to replace the bowsprit. While the main mast was removed by crane to the pierside without incident, the foremast dramatically broke in two at the crosstrees while being lowered to the dock. Immediately afterward, the release of strain on the rigging allowed the bowsprit to break from rot that had not previously been discovered.¹¹⁷

The new masts were supplied by vendor Intermountain Orient Company of Boise, Idaho, who sourced them from Fred Lockyear in Portland, Oregon, an 82-year-old craftsman with the necessary long lathe to turn the masts. The contract was let in June 1982 and the trees felled from the Silverwood Forest District in Oregon. The masts were delivered to Oakland in late May 1983. The bowsprit was supplied by Neydermeyer and Martin Company of Portland.¹¹⁸

Ironbark needed for the new mast hounds came from Australia and was supplied by Canusa Wood Products. Formulas for pine tar coatings for the shrouds were supplied by Mystic Seaport Museum in Connecticut and the schooner *Elissa* project in

Galveston, Texas. Randers Ropeworks in Denmark supplied new hemp for lanyards.¹¹⁹

The work accomplished during this yard period cost over \$400,000.¹²⁰

The yard period revealed extensive deterioration in the deck beams, clamps, ceilings, and frames, as well as dry rot from freshwater intrusion in the afterhouse, which could not be dealt with during this project. A surveyor's report concluded, "Vessel is felt to be in poor condition. Previous methods of arresting deterioration have actually accelerated it. . . . Repairs at this dry docking barely scratched the surface of deterioration found throughout the vessel. New timbers were added next to deteriorated timbers. Even with quantities of anti fungicide [sic], rapid deterioration is expected."¹²¹

1984

The 1983 restoration work revealed severe deterioration from dry rot in the deck timbers and clamps. Partial renewal of these timbers took place in 1984, as did renewal of "tongue and groove siding in the bulkhead [forward end of afterhouse?], in the afterdeck, and combing and margin pieces."¹²²

1985

The *Thayer* received a new main boom.¹²³

A meeting of marine surveyors and park project staff aboard the *Thayer* in November 1985 discussed and rejected the idea of sealing the

¹¹⁶ HSR, 24; Hastings, "Restoration of the C. A. Thayer," 17–19; "Three-masted schooner returns to museum," Santa Cruz *Sentinel*, January 18, 1984; Hull and Cargo Surveyors, Inc., "C. A. Thayer Solicitation #8000-84-46 Report of Condition Inspection / Survey at Pacific Drydock on October 14, 1983 and subsequent dates," HDC 1765, series 1.1.1, box 1, file 1.

¹¹⁷ Hastings, "Restoration of the C. A. Thayer," 17–19.

¹¹⁸ Hastings, "Restoration of the C. A. Thayer," 13–14, 17–19.

¹¹⁹ Hastings, "Restoration of the C. A. Thayer," 16.

¹²⁰ NPS Western Regional Office, Unit Price Contract CX 8000-3-0034, Drydocking C.A. Thayer, March 21, 1984; "C.A. Thayer Additional Work," December 12, 1983, both in HDC 648, series 12, box 8, folder 16; "C.A.

Thayer Add'l Work," November 2, 1983, HDC 648, series 12, box 8, folder 19; C.A. Thayer Preservation Program Summary, February 10, 1987, HDC 651, series 1, subseries 5, box 6, folder 3 of 4.

¹²¹ Hastings, "Restoration of the C. A. Thayer," 20; Hull and Cargo Surveyors, Inc., survey reports dated October 27, 1983 and February 2, 1984, HDC 648, series 12, box 8, folder 14.

¹²² USDO, NPS, FY 1986 Cultural Resources Preservation Program Project Evaluation and Priority Record, August 24, 1984, HDC 648, series 12, box 7, folder 2.

¹²³ Courtney Andersen, "Rigging the West Coast Lumber Schooner C.A. Thayer."

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rotten and leaking main deck with plywood, instead deciding that the deck should be recaulked. Mast boots were recommended to protect the wedges, planking, and partners where each mast passed through the deck. Additional ballast was recommended to deal with a distortion that had developed in the ceiling planking amidships (a result of the vessel's increasing hog).

¹²⁴

1987

The *C.A. Thayer*'s condition at the beginning of 1987 was summarized by two surveys, one by Tri-Coastal Marine conducted in November 1986 and one by Harold Huycke from February 1987. The latter noted, "Upon close and casual inspection, the vessel has noticeably deteriorated [since 1957] and is losing ground on the main deck, outboards, hull planking and bulwarks." ¹²⁵

The mizzen boom, rotten, was unshipped. Although the park ordered a new mizzen boom for \$2,384 from McFarland Cascade of Tacoma, Washington, in mid-September, it was not installed until 1989. ¹²⁶

During 1987, Tri-Coastal Marine developed a Cultural Resources Management Plan for the fleet at Golden Gate National Recreation Area. This outlined for the first time a strategy for a complete restoration of the *C.A. Thayer*, to be implemented over four years.

Phase 1, Fiscal Year 1988. Stabilization measures and reference survey, \$215,000

Phase 2, Fiscal Year 1989, Planning, materials acquisitions, barge to hold the vessel during restoration, \$1,090,000

Phase 3, Fiscal Year 1990. Restore strength to top of hull girder by renewing bulwarks, waterways, top futtocks, deck beams, clamp, and decking, \$2,000,000

Phase 4, Fiscal Year 1991. Complete the rebuilding, \$2,000,000 ¹²⁷

Although the new fleet plan called for drydocking the *Thayer* during Fiscal Year 1988, this was not funded. ¹²⁸ Instead, repairs to the topsides, main deck, and bulwarks were carried out at Hyde Street Pier by Richardson Bay Boatworks and Marine Ways between October 1987 and January 1988, at a cost of \$36,308. Additional work was carried out by NPS staff at the same time. The work included:

- Refastening 23 sprung topside plank butts by through-bolting them to the ceiling
- Replacing 66 linear feet of topside planking on the port side
- Recaulking in a variety of areas, and paying of port and starboard topside seams with Hydroseal
- Painting topsides
- Repairing deteriorated bulwark stanchions with cement and dutchmen.
- Replacing two deck planks forward on the starboard side, recaulking deck seams in areas, and paying all deck seams with pitch (done by NPS staff). ¹²⁹

¹²⁴ Marine Maintenance Foreman, memo to file, November 27, 1985, HDC 651, series 1, subseries 5, box 6, folder 2 of 4.

¹²⁵ Tri-Coastal Marine, "C.A. Thayer Condition Survey. Survey Findings," November 1986, HDC 1600, series 3.19, box 204, folder 20; Harold Huycke, "Survey Report, Survey No. 2339-87, Schooner C. A. Thayer," February 5–6, 1987, HDC 1600, series 3.19, box 204, folder 26 (copy also in HDC 1598, box 1, folder 5).

¹²⁶ Order No PX 8140-7-3140, September 11, 1987, HDC 651, series 1, subseries 5, box 6, folder 2 of 4.

¹²⁷ Tri-Coastal Marine, Cultural Resources Management Plan for the Fleet of Historic Ships of the Golden Gate National Recreation Area, January 18, 1988, 108–09.

¹²⁸ Don Birkholz, "Form 10-238, For Emergency Drydocking of C. A. Thayer," August 3, 1988, HDC 1765, series 1.1.1, box 1, file 1.

¹²⁹ HSR, 25; "Narrative Statement, Repair Topsides C.A. Thayer," [January 1988], HDC 1765, series 1.1.1, box 1, file 1; Specifications for *C.A. Thayer* rehabilitation, [1987], and Requisition DI 8140-7-9895, Modification 2, September 25, 1987, both in HDC 651, series 1, subseries 5, box 6, folder 1 of 4.

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1988

The park followed up the late 1987 repair work with a \$2,720 program of sanding and painting of the cap rails, pin rails, bulwarks, waterways, caval cleats, and ring bolts.¹³⁰

The Historic American Engineering Record documented the *Thayer* with large-format photography in April and an historical report that was completed in September. Measured drawings were completed in 1990.

A severe leak developed in the hull during August 1988, estimated to have a rate between 300 and 700 gallons per hour. The leak accelerated in early November, going from 1,200 gallons per hour to 6,000, according to one report.¹³¹ The vessel was drydocked at Pacific Drydock and Repair Company in Alameda on December 27, 1988, where the following work was undertaken:

- 65 linear feet of worm-damaged and rotten planking were replaced on the starboard side, amidships, at and below the waterline.
- Removal of rudder and steering gear
- Removal of plywood and felt along waterline and elsewhere. Water seepage at upper edge of plywood had been found to have accelerated rot in the waterline planking.
- Removal of plywood sheathing to expose worm show and keel; removal of remaining deteriorated portions of the worm shoe; bottom of keel felted and coppered

- Sea suction fitting moved from starboard to port side, with new fitting and sea cock.
- 14.25 inches of hog measured in keel¹³²

1989

San Francisco Maritime National Historical Park hosted a workshop on preserving the *C.A. Thayer* in January 1988, attended by park management, shipkeeping staff, and six outside “professionals in the field of large wooden vessel construction.” Discussion focused on both short term and long term treatments for the vessel. Removing the remaining plywood sheathing, treating existing rot, and ventilating the hull were recommended as short-term treatments. A discussion of continuing to display the vessel in the water or changing to a dry-berth display led to strong concurrence by all participants that floating display was preferred. “It was the opinion of the group, based on inspection of the vessel and review of survey documents, that the *Thayer* has deteriorated to the point where major rebuilding . . . will be required in order to preserve the vessel over the long term . . . All agreed that it is technically feasible to rebuilt the *Thayer* and that, for certain structural elements of the vessel, there appears to be no other option.” The group recommended retention of original structural fabric if at all possible, particularly of the main deck beams, knees, ceiling planking, keel, and keelsons, but agreed that the frames, hull planking, and deck planking required nearly total replacement.¹³³

The new Douglas fir mizzen boom, ordered in late 1987, was installed, using ironwork and jaws removed from the old boom.¹³⁴

¹³⁰ “C.A. Thayer Cap Rails and Bulwarks Project,” February 23, 1988, HDC 651, series 1, subseries 5, box 6, folder 2 of 4.

¹³¹ Steve Hyman, memo to Brian O’Neill, et al., re: CA Thayer Emergency Plans, August 16, 1988, HDC 1765, series 1.1.1, box 1, file 1; SAFR Project Manager, memo to GOGA contract specialist, re: Justification for Other than full and open competition, November 14, 1988; Leo R. Guillory to Pacific Drydock and Repair Company,

November 18, 1988, both in HDC 1765, series 1.1.1, box 1, file 1.

¹³² HSR, 24–25; “Scope of Work, Repair of Worm Shoe on C.A. Thayer Keel,” January 12, 1989, revised February 17, 1989, HDC 1765, series 1.1.1, box 1, file 1.

¹³³ Tri-Coastal Marine, Inc., “C.A. Thayer Preservation Workshop: A Discussion of Preservation Options. Summary and Conclusions,” February 10, 1989, HDC 1600, series 3.19, box 204, folder 20.

¹³⁴ HSR, 26.

1991

The *Thayer* was hauled out at Pacific Drydock and Repair Company, Oakland. A summary of the work done has not been located.

The ship's electrical system was removed and replaced by Albert Electric Company, under contract. The work was planned in 1990 and started in 1991 after the *Thayer* returned from drydock. After various delays, the work was completed in 1992.¹³⁵

The park organized a C.A. *Thayer* Preservation Committee, led by Morris Guralnick Associates, Inc., which met in February 1991. The committee (also described as a board of survey) comprised ten specialists in wood shipbuilding and ship preservation, including Don Birkholz, Maynard Bray, John Carter, Jack Ehrhorn, Fred Fisher, Dana Hewson, Harold Huycke, Doug Lee, Linda Lee, and Harold Sommer. The committee inspected the *Thayer* in drydock, and its members were "generally dismayed about the condition of certain parts of it."¹³⁶

The committee's meeting and survey resulted in two reports. The first, submitted in June 1991, took the form of a series of resolutions that recommended:

- Creating written instructions for the ship's routine maintenance
- Assigning a shipkeeper to the *Thayer*
- Beginning sodium borate antifungal treatments aboard the *Thayer*
- Removing ceiling strakes closest to the keelsons to allow cleaning, survey, and ventilation of the bilges and frame bays
- Restoring the vessel "in due course . . . with the same materials, configuration, standards of workmanship as [the] original"

- Hiring a qualified and dedicated project manager to oversee *Thayer* restoration
- Developing a detailed materials list for the complete restoration of the *Thayer*
- Beginning procurement of long-lead-time materials for restoration
- Securing suitable funding for restoration

¹³⁷

The second report, submitted in draft form in July and final form in January 1992, suggested preservation methods the park could employ aboard the schooner. It also recommended the use of sodium borate on the hull timbers to slow rot, and identified the leaking deck as the chief contributor to accelerating deterioration in the hull timbers below. "So much water leaks through now [between the waterways and the covering boards] that there are mold and fruiting fungus bodies underneath." Other short-term preservation treatments the report advised were:

- Increasing routine maintenance
- Ceasing freshwater washing of the deck
- Repairing the deck
- Beginning sodium borate treatment
- Removing the lowest strake of bilge ceiling port and starboard to increase ventilation
- Adding 125 long tons of lead ballast in the hold to decrease the bending moment of the hull¹³⁸

A third preservation report concerning the *Thayer* was released in 1991, a draft Historic Structure Report prepared over the course of four years by Tri-Coastal Marine under the direction of Don Birkholz. It summarized the vessel's history, both in service and as a museum vessel, evaluated its current condition and the integrity and significance of remaining historic fabric, presented a set of

¹³⁵ See contract documents and correspondence in HDC 1609, series 4.04, box 47, folder 17.

¹³⁶ "C.A. *Thayer* Preservation Committee Meeting" [report], June 1991, in HDC 1609, series 4.04, box 47, folder 18.

¹³⁷ Ibid.

¹³⁸ Morris Guralnick Associates, Inc., "Preserving the Schooner C.A. *Thayer*," July 10, 1991, revised January 9, 1992, 12, 19–20, copy in HDC1609, series 4.04, box 47, folder 25.

measured drawings, and analyzed treatment alternatives.

"If *C.A. Thayer* is to survive into the next century," Birkholz wrote in the report's introduction, "major action must be taken in the near future. Difficult decisions will have to be made, as none of the options for the vessel's preservation are without drawbacks."¹³⁹ The HSR presented five options, which are listed here along with key arguments for or against their use:

1. Deaccession and disposal. "The vessel's present condition, though serious, does not warrant disposal."
2. Maintain status quo. "At present, steps to preserve *C.A. Thayer* are limited to routine and cyclical maintenance, with occasional localized repair of deteriorated fabric. . . . [S]urveys have shown that [this level of effort] has not been adequate to arrest or appreciably slow her rate of deterioration."
3. Stabilization. "The stabilization option would attempt to arrest or slow the vessel's rate of deterioration, but would not undertake major restoration or repairs."
4. Preservation in a dry berth. "The primary drawback to this option lies in the lack of evidence that dry-berthing a wooden-hulled vessel will reduce maintenance costs and ensure preservation. Evidence indicates the contrary."
5. Restoration for exhibit afloat. "Restoration would primarily involve renewal of deteriorated structural elements as needed to restore hull strength and watertight integrity. This is the only option that will allow *C.A. Thayer* to continue in her role as a floating exhibit without jeopardizing her long-term preservation."
 - a. Restoration through periodic repairs. "The advantages to this method of restoration are that it would not necessitate removing the vessel from public display for an extended period of time and would not require a major amount of funding in any single fiscal year. There are several disadvantages, not the least of which is cost—with a start-stop program, the overall project cost can be expected to at least double. Wastage of material and labor would also result, as structure that has been renewed during one phase would have to be partially disassembled to carry out repairs in subsequent phases. The original method of construction, a significant feature of the vessel, would be altered, because the piecemeal approach to restoration will not allow use of long lengths of timber or traditional methods of assembly. The end product would therefore be inferior to the original construction in terms of hull strength and historic integrity."
 - b. Restoration in two to four phases. "Regardless of the sequencing, material and labor would be wasted in an effort to structurally tie in each phase of the work. Overall cost and amount of wastage would increase in proportion with the number of phases."
 - c. Restoration in one phase. "Overall project costs would be considerably reduced. Extensive disassembly of the hull will be possible, thus allowing the structure to be rebuilt in much the same manner as it was originally constructed. The major drawback to a single-phase restoration is the demand it will place on the Park's resources, as adequate funding will have to be available to complete the

¹³⁹ HSR, 1.

work without interruption. This approach will also remove the vessel from public display for an extended period of time, possibly as long as eighteen months.”¹⁴⁰

The HSR concluded that the *C.A. Thayer* should be preserved for display afloat and that “restoration is the only treatment that will support this use over the long term.” Recommending restoration in a single phase, the report warned that “developing and carrying out such a program will require considerable lead time for planning, further research, and acquisition of materials, skilled labor, and a suitable site. For this reason, stabilization is recommended as an interim treatment to prevent further loss of historic fabric and weakening of the hull due to ongoing decay.”¹⁴¹

The report recommended, therefore, the immediate start of an initial two-year period of detailed planning and structural stabilization, followed by restoration proper, which it estimated could be completed in two years, although as long as eight to ten years might be required between Phase I planning and Phase II restoration to acquire the needed lumber. The report estimated Phase I would cost \$395,000–\$640,000, and Phase II \$5.022–\$6.318 million.¹⁴²

1993

Tri-Coastal Marine prepared the first list of timber required to completely restore the *C.A. Thayer*. This list was refined by Stephen Canright and formed the basis for the park’s search for lumber

over the next decade. The list called for 1,947 individual pieces totaling 361,823 board feet.¹⁴³

The *Thayer*’s foremast ratlines and lanyards were renewed in summer 1993. “Because of extensive corrosion on the bolts and chain plates, the bolts were cut and beaten out of the chain plates. New bolts were made from long bolts found in the warehouse, by cutting and re-threading. New rope was located on board [the ferry] *Eureka* As the material is a bit undersized Double Mat[t]hew Walker knots have been tied and whippings sewn on.”¹⁴⁴

The main boom installed in 1985 was removed.¹⁴⁵

1994

Rot pockets in the deck were filled with cement at some point in Fiscal Year 1994.¹⁴⁶

1995

Ventilation to the bilge under the fishermen’s forecandle was improved by cutting two 2-foot square openings through the bulkhead dividing the forecandle from the hold to slow rot in the sole.¹⁴⁷

The park proposed improving emergency egress from the fishermen’s forecandle via the chain locker, which already had a ladder leading to a hatch through the main deck. The proposal called for cutting a hatch into the forward bulkhead of the forecandle, enlarging the main-deck hatch above the chain locker, and installing a half deck with handrails over the port half of the chain locker. The park received approval for this undertaking from the California state historic preservation officer and applied to the Advisory Council on Historic Preservation for further

¹⁴⁰ HSR, 49-51.

¹⁴¹ HSR, 51.

¹⁴² HSR, 77.

¹⁴³ Stephen Canright, “Reconfigured Timber List for Thayer, by the piece,” November 18, 1993. Many copies throughout the SAFR archives; see HDC 1609, series 4.04, box 47, folder 30.

¹⁴⁴ Timothy Przygocki, “Progress on C.A. Thayer foremast project as of 8/6/93,” HDC 1609, series 4.04, box 47, folder 20.

¹⁴⁵ Courtney Andersen, “Rigging the West Coast Lumber Schooner *C.A. Thayer*.”

¹⁴⁶ SAFR Ships Manager, memo to SAFR Superintendent, re: C.A. Thayer Preservation, October 24, 1994, HDC 1609, series 4.04, box 47, folder 25.

¹⁴⁷ Thomas D. Mulhern Jr., memo to SAFR Superintendent, re: Compliance for undertaking, Historic Preservation Legislation, Programmatic Agreement (NPS, Advisory Council, Conference SHPOs), June 27, 1995, HDC 1609, series 4.04, box 47, folder 25.

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approval. It is not clear if the latter was received nor if the work was ever carried out.¹⁴⁸

A serious leak developed in the port side amidships in October 1995, with 3 feet of water a day coming through. The leak was temporarily repaired by contract divers and park staff.¹⁴⁹

The *Thayer* was hauled out in November at Bay Ship and Yacht in Alameda. The remaining plywood sheathing covering the underwater body was removed. Damaged planking underwater was replaced, and repairs were made to the topside planking at the starboard quarter, on the starboard side of the transom, and at the port mizzen chainplates.¹⁵⁰

The plywood sheathing had been installed to protect the hull from marine borers. Removal of the plywood left thousands of nail holes in the hull planking, which formed ideal entry points for ship worms. These holes were not plugged using dowels during the 1995 haul out, only “wiped over with epoxy and/or cement.” About one-third of the holes were filled but not burned in 1998.¹⁵¹

1997

In February, the main and mizzen masts were discovered to have rot, the former in way of the crosstrees and the latter in way of the upper shrouds. In both cases, the rot had been encouraged by manila rope grommets being installed under the upper shrouds where the

shrouds wrap around the masts, with the grommets absorbing and retaining water. “Some periodic maintenance was done on the masts below the crosstrees where little evidence of rot was found, but no maintenance of the painted surfaces above the crosstrees has been done since the masts were installed [in 1983].” The main mast was lifted off the ship in August. Lumber for new masts and spars was ordered through Oregon West Lumber Sales, Inc.¹⁵²

Staff noticed steadily increasing leaking in July 1997. After removal of the main mast, the leaking decreased by more than half. John Conway noted, “[I]t’s possible marine growth has grown into the seam that was leaking. The other, more disturbing possibility is that the removal of the mast without replacing the weight amidships has increased the [vessel’s] hog, closing the seam.” Taking measurements, Conway found an increase in hog of 1 5/16 inches between July 30 and September 1.¹⁵³

1998

Two leaks were located and repaired by divers on May 5, 1998.¹⁵⁴

Three new masts, two new booms, and two gaffs were made for the *Thayer* by Oregon West Lumber Sales.¹⁵⁵

The vessel was drydocked at Bay Ship and Yacht, Inc., Alameda, in November for hull survey and hull

¹⁴⁸ Robbyn Jackson, memo to SAFR Superintendent, re: Section 109 Compliance for Fire Safety Modification on the C.A. Thayer, October 27, 1995, HDC 1609, series 4.04, box 47, folder 20.

¹⁴⁹ SAFR Superintendent, three memos related to Thayer leak, October 5, 1995 and undated, HDC 1609, series 4.04, box 47, folder 30.

¹⁵⁰ “Assessment of Actions having an effect on Cultural Resources (xxx Form), 1995, HDC 1609, series 4.04, box 47, folder 30; “Historical Vessel C. A. Thayer, 1995 Haul Out and Repair,” [specification draft for contract 1443-CX-8520-95-009], March 1995, HDC 1765, series 1.1.2, box 1, file 1.

¹⁵¹ “Report of Survey of the Three Masted Schooner C. A. Thayer,” November 23, 1998, HDC 1765 series 1.1.5.1, box 1, file 4.

¹⁵² John Conway and Dave Casebolt, memos to SAFR Superintendent, re: CA Thayer mast condition analysis, February 7 and 12, 1997, HDC 1609, series 4.04, box 47, folder 33; “Thayer Main Mast Removal,” [draft contract specifications], August 4, 1997, HDC 1609, series 4.04, box 47, folder 33.

¹⁵³ John Conway, “Report on Thayer Hog,” July 15, 1997; John Conway, memo to Wayne Boykin, re: Thayer Update, September 1, 1997, both in HDC 1765, series 1.1.3, box 1, file 4.

¹⁵⁴ Tom Belcher, memo to John Conway, April 30, 1998, HDC 1765, series 1.1.3, box 1, file 4.

¹⁵⁵ Courtney Andersen, “Rigging the West Coast Lumber Schooner C.A. Thayer”; J. Ronald Hallicka to Ron and Dave [Ron Oakes and Dave Houck], March 27, 1998, HDC 1765, series 1.1.5.1, box 1, file 3.

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painting. Additional work, carried out at a cost of \$240,349, included:

- Spot repair to worm damage
- Replacement of planks in way of the starboard main chain plates
- Replacement of 140 feet of bottom and topsides planking
- Renewal of 500 feet of caulking. Encapsulation of fishermen's forecastle
- Two water tanks, one wood and one steel, removed from either side of the forward deckhouse to storage
- Installation of the new main mast was an optional contract item but was not done.

¹⁵⁶

1999

Sodium borate treatment applied throughout the hull in August, using an amount of preservative recommended by U.S. Borax in 1992. ¹⁵⁷

2000

Tim McAllister and Ron Robisch of Designers and Planners, Inc., of Arlington, Virginia, submitted a "pre-design and site analysis" for the *C.A. Thayer* rehabilitation in June. The report looked at sources and costs for timber acquisition, presented tests of existing framing, and considered alternative approaches to the rehabilitation. ¹⁵⁸

2001

The *Thayer* was again hauled out at Bay Ship and Yacht for bottom cleaning and inspection in July and August 2001. Work included:

- Reefing and recaulking of 2,000 feet of seems and butts in the hull planking
- Replacement of 75 feet of bottom planking
- Replacement of 125 feet of topside planking on the starboard bow
- Priming and painting of the bottom and topsides
- Removal of mizzen mast
- Stepping of new mizzen mast shaped to match old mast; iron fittings and rigging reused.
- Removal of donkey boiler and engine ¹⁵⁹

On August 21, while being returned to Hyde Street Pier after haul out, the *Thayer* allided with a mooring buoy for the *Balclutha* and a mooring chain for the *Eppleton Hall*, damaging the port side aft and the stem below the waterline. The vessel returned to Bay Ship and Yacht in Alameda where indentations, scrapes, and a gouge were repaired with Splash Zone underwater epoxy. A tear in the copper sheathing on the stem was repaired with a sheet of lead. These were intended to be temporary repairs, and final repairs and repainting were done at Bay Ship and Yacht in late December. ¹⁶⁰

The first funding for full rehabilitation of the *C.A. Thayer* was appropriated by Congress in 2001: \$4.6 million as part of the Fiscal Year 2002 budget, with an additional \$4.6 million expected in Fiscal

¹⁵⁶ Contract 1443CX-8520-98-005, "Drydock the Historic Schooner C. A. Thayer for Repairs," HDC 1765, series 1.1.3, box 1, file 1; Fred J. Sheppard, Face Sheet for Completion Report, November 24, 1998, HDC 1765, series 1.1.3, box 1, file 3.

¹⁵⁷ Dave Casebolt, memo to SAFR Superintendent, re: Status Report, C A Thayer borate treatment project, October 4, 1999, HDC 1609, series 4.04, box 47, folder 34.

¹⁵⁸ Tim McAllister and Ron Robisch, "C. A. Thayer Rehabilitation, Task 1: Pre-design and Site Analysis," June 28, 2000, HDC 1609, series 4.04, box 47, folder 34.

¹⁵⁹ Contract no. C8520-01-0027, Drydock C.A. Thayer, May 24, 2001, with modifications to December 3, 2001, HDC 1609, series 4.04, box 48, folder 41; "Completion Report, C.A. Thayer Drydocking, contract no. C8520-01-0027," [January 2002?], HDC 1765, series 1.1.4, box 1, file 3.

¹⁶⁰ "Westar Marine Services Marine Incident Report," August 21, 2001; Dana R. Teicheira, "Report of Survey, vessel C.A. Thayer, file no. 01169," August [31], 2001; Gerona Goethe, Bay Ship and Yacht Co., to Fred Sheppard, September 4, 2001, all HDC 1765, series 1.1.3, box 1, file 4.

Completion Report

Year 2003.¹⁶¹ With initial funding secured, park staff drafted the rehabilitation specifications needed to bid and award the construction contract.¹⁶²

¹⁶¹ William G. Thomas to Ed Shields, December 10, 2001, HDC 1609, series 4.04, box 48, folder 43.

¹⁶² "Historic Vessel C.A. Thayer Rehabilitation Statement of Work," December 12, 2001, HDC 1765, series 1.1.5.3, box 3, file 12, folder 1.

Appendices

[Appendix A](#). Bibliography

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[Appendix C](#). Existing Condition Photographs

[Appendix D](#). Expanded Chronology

[Appendix E](#): Extended List of Character-Defining Features

[Appendix F](#): Fire Protection Engineer Report

[Appendix G](#): The Secretary of the Interior's Standards for Historic Vessel Preservation Projects

[Appendix H](#): Meeting Minutes

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Appendix A

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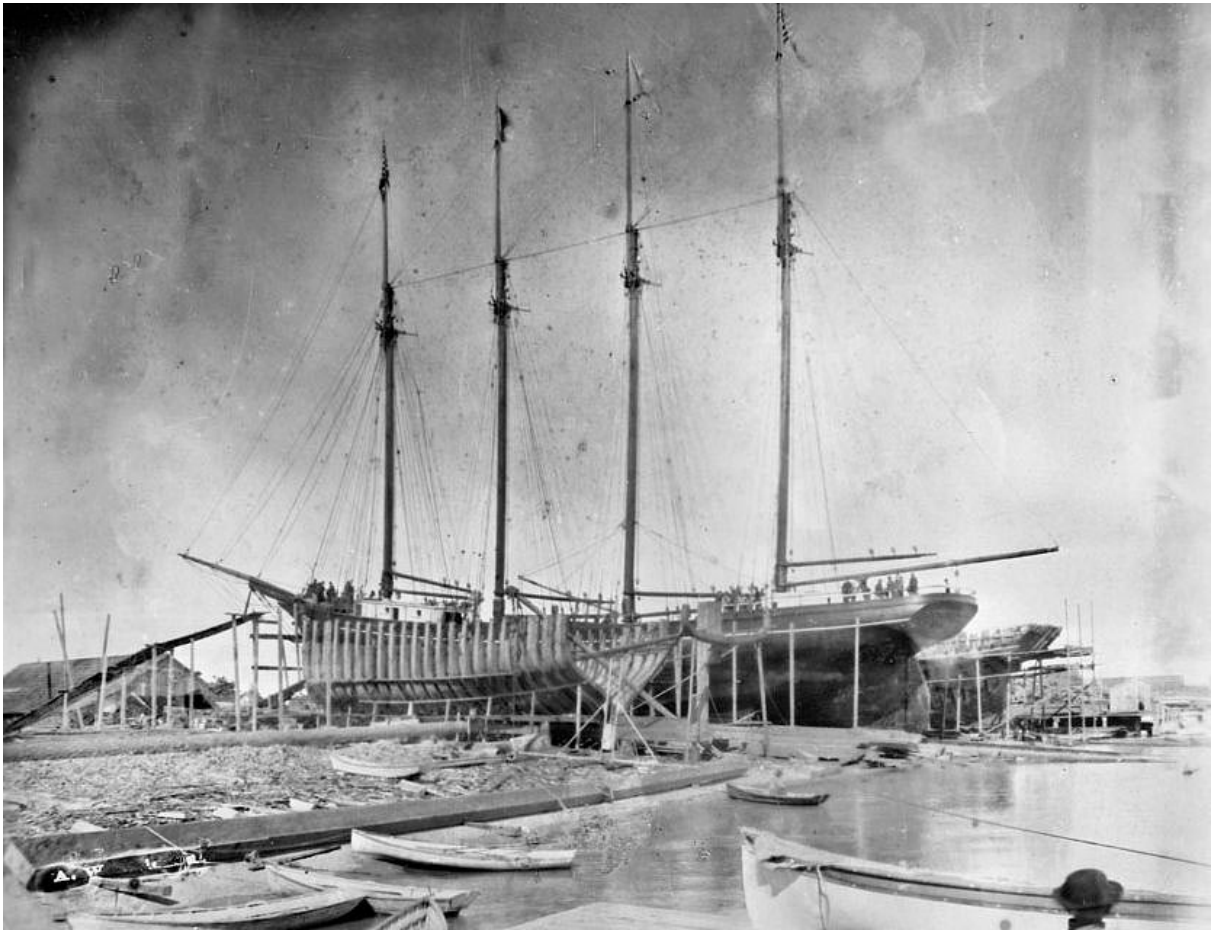
Bay Ship and Yacht Company. Progress and condition documentation photographs from *C.A. Thayer* Rehabilitation, 2003–2007. HDC 1765 digital files.

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Harry Dring Photograph, 1870–1983. SAFR. P91-015.

Appendix B

Historic Photographs



Bendixsen's shipyard, Fairhaven, California, c. 1885 (Mendocino Coast Model Railroad and Historical Society).

Historic Photographs



Two lumber schooners at Mendocino Harbor, c. 1895 (California State Library Digital Collection).



C. A. Thayer docked at the E. K. Wood Lumber Co. yard at what is now Mission Creek Channel, c. 1900 (San Francisco Maritime National Historical Park).

Historic Photographs



C.A. Thayer stranded at Gray's Harbor, Oregon, 1903 (San Francisco Maritime National Historical Park).

Historic Photographs

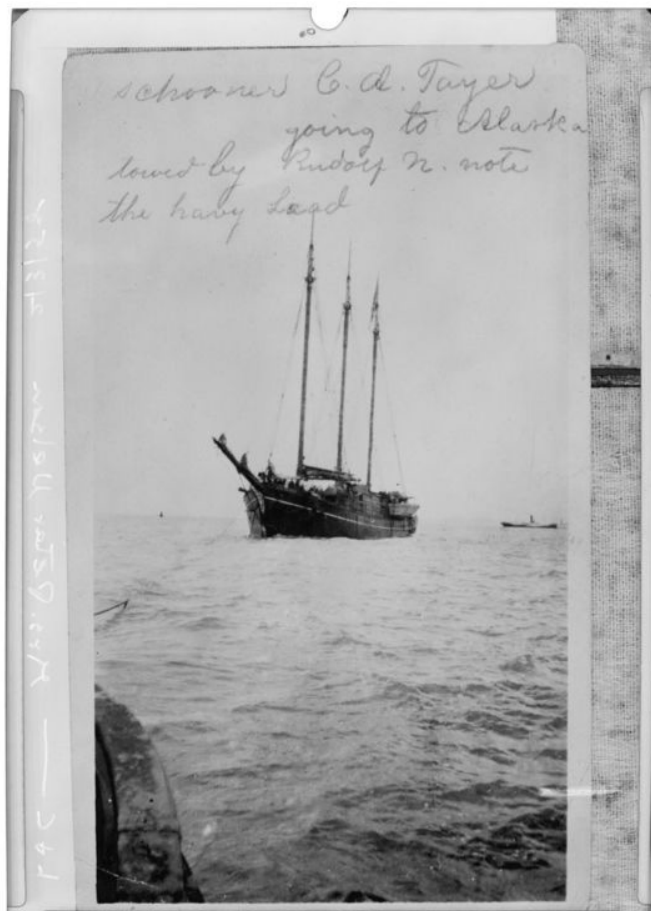


C. A. Thayer under sail during first voyage to Bristol Bay, Alaska, 1912 (San Francisco Maritime National Historical Park).



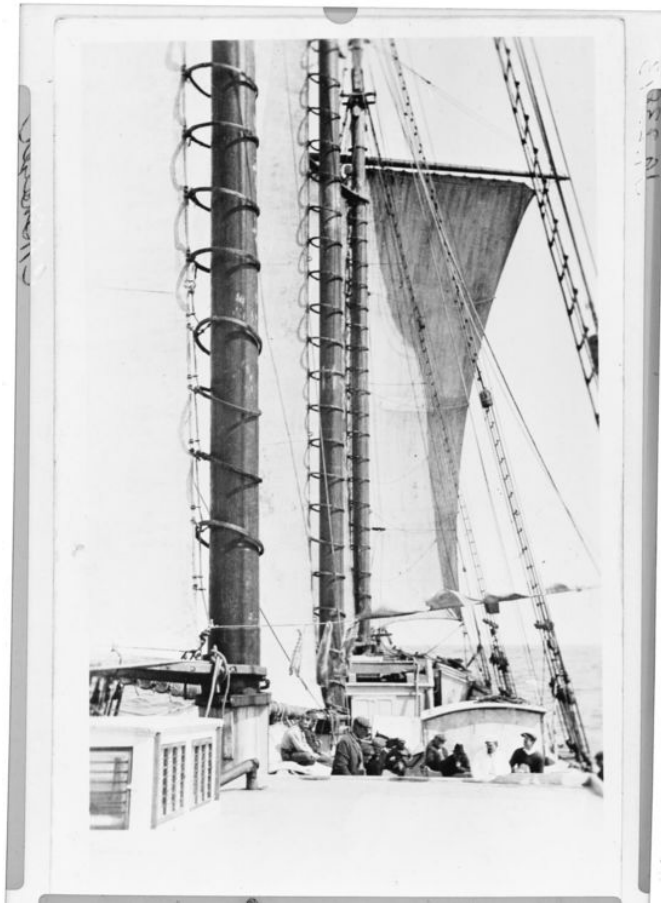
C. A. Thayer loaded with lumber at the E. K. Wood Lumber Co. mill in Hoquiam, preparing to embark for Honolulu, 1912 (San Francisco Maritime National Historical Park).

Historic Photographs



C.A. Thayer under tow to Alaska 1912 (San Francisco Maritime National Historical Park).

Historic Photographs



View of deck on C.A. Thayer, looking forward, on voyage headed for Alaska c. 1914 (San Francisco Maritime National Historical Park).

Historic Photographs



Men securing codfishing dories aboard the C. A. Thayer, undated photograph, c. 1930s (San Francisco Maritime National Historical Park Digital Archive).



C. A. Thayer operating as a tourist attraction in the Hood Canal, undated, c. 1955 (San Francisco Maritime National Historical Park Digital Archive).

Historic Photographs



Shipwrights at work on C.A. Thayer in 1959 at the San Francisco Maritime State Historical Park (NPS Photo, SAFR P91-015).



C. A. Thayer at the San Francisco Maritime State Historical Park at Hyde Street Pier, 1965 (National Register Nomination, 1966).

Historic Photographs



C. A. Thayer returning to San Francisco under tow following haul-out and repair at a local shipyard, 1988 (San Francisco Maritime National Historical Park).

Appendix C

Existing Condition Photographs

All photographs are by ARG. Photographs from dry dock were taken in 2020 and images of C.A. Thayer berthed at the Hyde Street Pier are from 2021.

EXTERIOR - IN DRY DOCK, 2020



C.A. Thayer in dry dock, 2020 (Architectural Resources Group).

Existing Condition Photographs



C.A. Thayer in dry dock, 2020 (Architectural Resources Group).

Existing Condition Photographs



C.A. Thayer in dry dock, 2020 (Architectural Resources Group).

Existing Condition Photographs



C.A. Thayer in dry dock, 2020 (Architectural Resources Group).

Existing Condition Photographs



C.A. Thayer in dry dock, 2020 (Architectural Resources Group).

Existing Condition Photographs



C.A. Thayer in dry dock, 2020 (Architectural Resources Group).

Existing Condition Photographs



C.A. Thayer under construction in dry dock, 2020 (Architectural Resources Group).

Existing Condition Photographs



C.A. Thayer in dry dock, 2020 (Architectural Resources Group).

Existing Condition Photographs



C.A. Thayer in dry dock, 2020 (Architectural Resources Group).

Existing Condition Photographs

EXTERIOR - AT HYDE STREET PIER, 2021



C.A. Thayer docked at the Hyde Street Pier, 2021 (Architectural Resources Group).

Existing Condition Photographs



C.A. Thayer docked at the Hyde Street Pier, 2021 (Architectural Resources Group).

Existing Condition Photographs



C.A. Thayer docked at the Hyde Street Pier, 2021 (Architectural Resources Group).

Existing Condition Photographs



C.A. Thayer docked at the Hyde Street Pier, 2021 (Architectural Resources Group).



C.A. Thayer docked at the Hyde Street Pier, 2021 (Architectural Resources Group).

Existing Condition Photographs



C.A. Thayer docked at the Hyde Street Pier, 2021 (Architectural Resources Group).

Existing Condition Photographs



C.A. Thayer, view on main deck, 2021 (Architectural Resources Group).



C.A. Thayer, view on poop deck, 2021 (Architectural Resources Group).

Existing Condition Photographs



C.A. Thayer, view on poop deck, 2021 (Architectural Resources Group).

Existing Condition Photographs



C.A. Thayer, view on main deck, 2021 (Architectural Resources Group).

Existing Condition Photographs



C.A. Thayer, view on main deck, 2021 (Architectural Resources Group).

Existing Condition Photographs



C.A. Thayer, view on main deck, 2021 (Architectural Resources Group).

Existing Condition Photographs

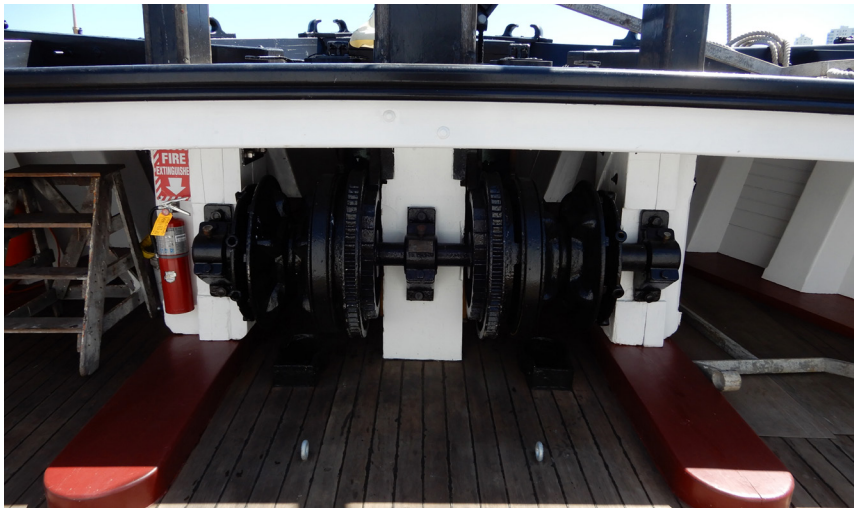


C.A. Thayer, view on main deck, 2021 (Architectural Resources Group).

Existing Condition Photographs



C.A. Thayer, view on main deck, 2021 (Architectural Resources Group).



C.A. Thayer, view on deck, 2021 (Architectural Resources Group).

Existing Condition Photographs

INTERIOR - IN DRY DOCK, 2020



C.A. Thayer, view inside hold, 2020 (Architectural Resources Group).

Existing Condition Photographs



C.A. Thayer, view inside hold, 2020 (Architectural Resources Group).



C.A. Thayer, view inside hold, 2020 (Architectural Resources Group).



C.A. Thayer, view inside cabin, 2020 (Architectural Resources Group).



C.A. Thayer, view inside cabin, 2020 (Architectural Resources Group).

Existing Condition Photographs

INTERIOR - AT HYDE STREET PIER, 2021



C.A. Thayer, view inside hold, 2021 (Architectural Resources Group).



C.A. Thayer, view inside hold, 2021 (Architectural Resources Group).

Existing Condition Photographs



C.A. Thayer, view inside hold, 2021 (Architectural Resources Group).

Existing Condition Photographs



C.A. Thayer, view inside aft cabin, 2021 (Architectural Resources Group).



C.A. Thayer, view inside aft cabin, 2021 (Architectural Resources Group).



C.A. Thayer, view inside aft cabin, 2021 (Architectural Resources Group).

Appendix D

Expanded Chronology

C. A. Thayer Chronology/Research Notes		
Year	Note	Citation
c. 1868	Danish-born shipbuilder Hans Ditlev Bendixsen establishes shipbuilding yard in Eureka, California, on the east side of Humboldt Bay.	Eric Lloyd Clements, "Historic American Engineering Record, Addendum to Schooner C. A. Thayer, HAER No. CA-61," September 1988, p. 4.
1869-1900	H. D. Bendixsen constructs over 100 ships and is regarded as the most prolific of the many shipbuilders on Humboldt Bay.	Eric Lloyd Clements, "Historic American Engineering Record, Addendum to Schooner C. A. Thayer HAER No. CA-61," September 1988, p. 4
1875	H. D. Bendixsen moves his shipbuilding yard to Fairhaven on the west side of Humboldt Bay, which within a few years covers 14 acres including shops, sawmills, and housing for 150 workers.	Eric Lloyd Clements, "Historic American Engineering Record, Addendum to Schooner C. A. Thayer, HAER No. CA-61," September 1988, p. 4.
1895	E. K. Wood Lumber Company forms, with mills located at Hoquiam at Grays Harbor, Washington and lumber yard and sales offices in San Francisco.	Eric Lloyd Clements, "Historic American Engineering Record, Addendum to Schooner C. A. Thayer HAER No. CA-61," September 1988, p. 5.
July 8, 1895	C. A. Thayer launched from the Fairhaven shipyard of H. D. Bendixsen under command of Captain C. W. Lilliquist. Ownership team includes 19 persons and entities, with ¼ share retained by the builder, and E. K. Wood Lumber Company serving as the managing owner. The ship was named for Wood Company secretary Clarence A. Thayer. Though constructed for the Pacific Coast lumber trade, the vessel's first voyage was to Fiji with a load of fir wood.	National Park Service, Western Division, "National Register of Historic Places Inventory Nomination Form, C. A. Thayer," September 20, 1979 (entered), p. 3.
1895-1912	C. A. Thayer works as a lumber carrier for managing owner E. K. Wood Lumber Company, transporting lumber between the company's mill in Hoquiam, Washington and its yard in San Francisco, as well as other West Coast ports including San Diego and San Pedro (Los Angeles), and Hawaii, Fiji, and Mexico.	Eric Lloyd Clements, "Historic American Engineering Record, Addendum to Schooner C. A. Thayer, HAER No. CA-61," September 1988, p. 11.
1901-1904	Ole Monson serves as captain of the Thayer after C. W. Lilliquist was promoted to captain of a new, larger ship operated by E. K. Wood Co.	Eric Lloyd Clements, "Historic American Engineering Record, Addendum to Schooner C.

C. A. Thayer Chronology/Research Notes		
Year	Note	Citation
		<i>A. Thayer</i> , HAER No. CA-61," September 1988, p. 11; Records of the Marine Exchange, Pier 45-D, San Francisco, by John H. Plimpton, May 1963. Republished in "Notes on the <i>C. A. Thayer</i> ," compiled by Ted Miles and Karl Kortum, 1988.
c. 1903	Original donkey engine, installed at construction and provided by Humboldt Iron Works, removed by this year.	Tri-Coastal Marine, Inc., Schooner <i>C. A. Thayer</i> Historic Structure Report 1991 Draft, Prepared for the San Francisco Maritime National Historical Park, 1991, p. 10.
November 1903	<p>Under command of Captain Ole Monsen, <i>C. A. Thayer</i> went ashore on the North Spit of Grays Harbor, Washington, on November 8, 1903 and was refloated on December 2, 1903 with damage limited to loss of rudder, rudderpost, and both anchors.</p> <p>A photograph taken at the time of the vessel's stranding show details of what is presumed to be her original configuration. She is seen as a three-mast, "bald headed" schooner with masts of equal height. Above the upper mast bands, to which triatic stays are fixed, "pole" topmasts taper to a round truck onto which small topsails are bent with hoops. Her masts are not cut square at the cap, indicating she was not designed to carry topmasts. She is rigged with deadeyes and lanyards on the standing rigging. She has a spike bowsprit. Also visible are raised pinrails on the shrouds, a modification demanded by the practice of carrying great deckloads of lumber. For the same reason, the deck lacked permanent obstructions such as foot blocks, bitts, deck pumps, etc.</p>	Tri-Coastal Marine, Inc., Schooner <i>C. A. Thayer</i> Historic Structure Report 1991 Draft, Prepared for the San Francisco Maritime National Historical Park, 1991, p. 11.
1904	<i>Thayer</i> is reported to have lost her jib and main sail in a gale.	Tri-Coastal Marine, Inc., Schooner <i>C. A. Thayer</i> Historic Structure Report 1991 Draft, Prepared for the San Francisco Maritime National Historical Park, 1991, p. 11.
1904-1908	Gus Peterson serves as captain of the <i>Thayer</i> .	Records of the Marine Exchange, Pier 45-D, San Francisco, by John H.

C. A. Thayer Chronology/Research Notes		
Year	Note	Citation
		Plimpton, May 1963. Republished in "Notes on the C. A. Thayer," compiled by Ted Miles and Karl Kortum, 1988.
1908-1912	Ingman (first name unknown; 1908-1910), Oscar Jacobson (1911-1912), and Fred Scott (1912) serve as captain of the <i>Thayer</i> .	Records of the Marine Exchange, Pier 45-D, San Francisco, by John H. Plimpton, May 1963. Republished in "Notes on the C. A. Thayer," compiled by Ted Miles and Karl Kortum, 1988
January 1912	On January 14, 1912, the <i>C. A. Thayer</i> radioed for assistance while leaking badly and in immediate danger of sinking about 20 miles off the Humboldt Bar, the first time the presence of a radio is noted on the ship. The <i>Thayer</i> was leaking badly despite continual pumping: the donkey engine had been reinstalled but was not usable due to limited fresh water, and hand pumps had clogged. The ship was at sea in this condition for 11 days when she was rescued by steamer <i>J. B. Stetson</i> and towed to San Francisco Bay. Owners of the <i>Stetson</i> filed a \$9,000 salvage claim on the <i>Thayer</i> . E. K. Wood Co. opted not to pay this claim or complete necessary repairs to the <i>Thayer</i> , and instead laid the ship up in Oakland.	Tri-Coastal Marine, Inc., Schooner <i>C. A. Thayer</i> Historic Structure Report 1991 Draft, Prepared for the San Francisco Maritime National Historical Park, 1991, p. 12.
Spring 1912	Peter M. Nelson, purchased <i>C. A. Thayer</i> from the E. K. Wood Co. for about \$10,000, for use in his salmon saltery operations at Bristol Bay, Alaska. The vessel undergoes few modifications for its new trade, and indeed remains able to transport lumber, as it returned to that task for several voyages during World War I	Tri-Coastal Marine, Inc., Schooner <i>C. A. Thayer</i> Historic Structure Report 1991 Draft, Prepared for the San Francisco Maritime National Historical Park, 1991, p. 13.
April 28, 1912	<i>C. A. Thayer</i> departs San Francisco Bay for first season of work in the salmon saltery business.	Eric Lloyd Clements, "Historic American Engineering Record, Addendum to Schooner <i>C. A. Thayer</i> , HAER No. CA-61," September 1988, p. 16.
1912-1924	<i>C. A. Thayer</i> works as a transport ship for Peter M. Nelson's salmon saltery operations, departing San Francisco Bay in April loaded with supplies including salt, fishing equipment, hoops to bind barrels, and a small crew of men to operate the saltery, along with all of their personal supplies and the materials needed for operating the salteries; sitting anchored on the Kvichak River during summer months; returning to San Francisco Bay in September loaded with barrels full of salted	National Park Service, Western Division, "National Register of Historic Places Inventory Nomination Form, <i>C. A. Thayer</i> ," September 20, 1979 (entered), p. 3.

C. A. Thayer Chronology/Research Notes		
Year	Note	Citation
	salmon, supplies, and men; and repaired and refitted at a shipyard in Oakland Creek (now Oakland Estuary) during winter months, in preparation for the following season's voyage.	
1915-1919	During these years the <i>C. A. Thayer</i> made four off-season (October-March) voyages to Australia. Transport ships were in short supply due to World War I and Peter M. Nelson capitalized on high freight rates shipping Redwood and pine lumber to Australia and returning with hardwood, copra (dried coconut used for making coconut oil), and coal.	National Park Service, Western Division, "National Register of Historic Places Inventory Nomination Form, <i>C. A. Thayer</i> ," September 20, 1979 (entered), p. 3.
1918-1919	On her way to Australia the <i>Thayer</i> suffered damage to the rig and sails, and on the return journey leaked badly. A photograph from this era shows the vessel with a West Coast-style square foresail set on its yard on the foremast. This was a two-part sail which brailed into the mast, rather than up to the yard, so that the weather half, which would not be blanketed by the large gaff foresail, could be set alone.	Tri-Coastal Marine, Inc., Schooner <i>C. A. Thayer</i> Historic Structure Report 1991 Draft, Prepared for the San Francisco Maritime National Historical Park, 1991, p 13.
February 7, 1925	Peter M. Nelson sells all of his company holdings to A. & P. Products Corporation, including salteries, fishing boats, and the <i>C. A. Thayer</i> .	Eric Lloyd Clements, "Historic American Engineering Record, Addendum to Schooner <i>C. A. Thayer</i> , HAER No. CA-61," September 1988, p. 25.
February 1925	Captain John E. Shields, principal owner of Pacific Coast Codfish Company of Poulsbo, Washington, arranges to buy the <i>C. A. Thayer</i> while the vessel is in drydock in Oakland. Shields repaired and refitted the vessel for codfishing use and departed San Francisco Bay for Puget Sound, Washington in early March 1925.	Eric Lloyd Clements, "Historic American Engineering Record, Addendum to Schooner <i>C. A. Thayer</i> , HAER No. CA-61," September 1988, p. 25.
April 13, 1925	A. & P. Products Corporation sells the <i>C. A. Thayer</i> to Captain John E. Shields for the sum of \$1.60.	Eric Lloyd Clements, "Historic American Engineering Record, Addendum to Schooner <i>C. A. Thayer</i> , HAER No. CA-61," September 1988, p. 25.
April 26, 1925	<i>C. A. Thayer</i> departs Seattle, Washington for first season of codfishing in the Bering Sea. Upon return to port in September 1925 the <i>Thayer</i> held 256,160 fish, the largest catch of the Puget Sound codfishing fleet.	Eric Lloyd Clements, "Historic American Engineering Record, Addendum to Schooner <i>C. A. Thayer</i> , HAER No. CA-61," September 1988, p. 25.

C. A. Thayer Chronology/Research Notes		
Year	Note	Citation
1925-1931	<p><i>C. A. Thayer</i> works as a codfishing vessel for Pacific Coast Codfish Company, departing Puget Sound in the spring months, usually April, carrying fishermen, dories, and salt to the codfishing grounds of the Bering Sea, remaining at sea for six months before returning to the Puget Sound in the fall, usually September. All seven seasons were captained by John Grottle, and the average catch was 250,000 fish.</p> <p>The change to codfishing necessitated a number of alterations to the <i>Thayer</i> which are estimated to have occurred between 1925 and 1931, including:</p> <ul style="list-style-type: none"> • Additional bunks built for fishermen, amidships in the berthing area or “fisherman’s forecastle” at the forward portion of the hold; • Deckhouse extended forward to the break of the forecastle head and widened on the starboard side to provide a companionway into the galley, the crew dining area, and the fisherman’s forecastle; • 100-gallon drums were mounted to the main deck to provide a supply fresh water for extended periods at sea; • The size of the fore hatch opening was reduced; • The donkey engine was moved forward with the gypsy head mounted on the deckhouse roof, forward of the mast; • In addition to the traditional stern davits of her original equipment, six pairs of steel davits were fitted along the caprail, port, and starboard, to handle the fishermen’s dories. These dories, originally the traditional two-man sail and oar powered type that nested on the deck, were replaced c. 1927 by larger one-man boats powered by small outboard motors and protected by canvas dodgers; and, • Large gasoline tanks were mounted in the hold to fuel the dories. 	Eric Lloyd Clements, “Historic American Engineering Record, Addendum to Schooner <i>C. A. Thayer</i> , HAER No. CA-61,” September 1988, p. 26; Tri-Coastal Marine, Inc., Schooner <i>C. A. Thayer</i> Historic Structure Report 1991 Draft, Prepared for the San Francisco Maritime National Historical Park, 1991, p. 16.
September 1931	<i>C. A. Thayer</i> returned to Poulsbo, Washington with 302,000 fish in her hold, the largest catch ever recorded by an American schooner from the Bering Sea at that time.	Eric Lloyd Clements, “Historic American Engineering Record, Addendum to Schooner <i>C. A. Thayer</i> , HAER No. CA-61,” September 1988, p. 26.
1931-1941	The Great Depression and reduced demand for salted cod compelled the Pacific Coast Codfish Company to reduce their active fleet, and the <i>C. A. Thayer</i> is laid up in the freshwater port of Lake Union, Seattle, Washington for ten years.	Tri-Coastal Marine, Inc., Schooner <i>C. A. Thayer</i> Historic Structure Report 1991 Draft, Prepared for the San Francisco Maritime National

C. A. Thayer Chronology/Research Notes		
Year	Note	Citation
		Historical Park, 1991, p. 16.
1941	<p>In the lead-up to World War II cargo vessels of all types came to be in great demand. The U. S. Army purchased the <i>C. A. Thayer</i> in 1941 to serve as an ammunition transport barge on British Columbian and southern Alaskan waters. The vessel was substantially altered in order to be used for this purpose including:</p> <ul style="list-style-type: none"> • Masts removed; • Hull reinforced, with maximum hog described as 6 inches; and • Fore and main hatches lengthened, likely during this time although no confirming historical documentation has been found, so that the main hatch, which originally measured 15 feet fore and aft, was lengthened by cutting through the deck beam at the aft end of the hatch and installing longer carlings, extending the hatch aft by four feet, and the fore hatch was similarly lengthened by extending it forward by eight feet six inches. 	Tri-Coastal Marine, Inc., Schooner <i>C. A. Thayer</i> Historic Structure Report 1991 Draft, Prepared for the San Francisco Maritime National Historical Park, 1991, pp. 16-17.
1941-1946	<i>C. A. Thayer</i> owned by the U. S. Army and used as an ammunition transport barge on British Columbian and southern Alaskan waters. During these years the vessel was identified as "Barge <i>C. A. Thayer</i> ."	Tri-Coastal Marine, Inc., Schooner <i>C. A. Thayer</i> Historic Structure Report 1991 Draft, Prepared for the San Francisco Maritime National Historical Park, 1991, pp. 16-17.
1943	Karl C. Kortum, mariner and sailing ship enthusiast, began to muster public support for the establishment of a museum in San Francisco dedicated to the maritime history of the Pacific.	National Park Service, Western Division, "National Register of Historic Places Inventory Nomination Form, <i>C. A. Thayer</i> ," September 20, 1979 (entered), p. 5.
Spring 1946	<p>John E. Shields purchases the <i>C. A. Thayer</i> from the U. S. Army for several thousand dollars and uses elements of other ships to make necessary changes in order to return the <i>Thayer</i> to sea again as a codfishing vessel including:</p> <ul style="list-style-type: none"> • Three masts, standing rigging, and headgear from <i>Sophie Christenson</i> installed; • Shrouds extended to reach chainplates with double steel straps bolted into place; • Deadeyes and lanyards replaced with open turnbuckles; • Original tapering topmasts gone (replaced by topmasts from the <i>Sophie Christenson</i>), and gaff- 	Tri-Coastal Marine, Inc., Schooner <i>C. A. Thayer</i> Historic Structure Report 1991 Draft, Prepared for the San Francisco Maritime National Historical Park, 1991, pp. 16-17.

C. A. Thayer Chronology/Research Notes		
Year	Note	Citation
	<p>headed mizzen sail replaced with smaller, easier to handle jib-headed or leg-of-mutton sail;</p> <ul style="list-style-type: none"> • Wheelhouse built over steering station; and • Spike bowsprit replaced by bowsprit-and-jibboom arrangement. 	
1946-1950	C. A. Thayer operates five more seasons as a codfishing vessel for Pacific Coast Codfish Company.	Tri-Coastal Marine, Inc., Schooner C. A. Thayer Historic Structure Report 1991 Draft, Prepared for the San Francisco Maritime National Historical Park, 1991, p. 17.
1950	In her last season at sea, the C. A. Thayer was the last operating sail-powered commercial vessel on the Pacific Coast.	National Park Service, Western Division, "National Register of Historic Places Inventory Nomination Form, C. A. Thayer," September 20, 1979 (entered), p. 5.
1950-1954	John E. Shields keeps C. A. Thayer laid up in the freshwater port of Lake Union, Seattle.	Tri-Coastal Marine, Inc., Schooner C. A. Thayer Historic Structure Report 1991 Draft, Prepared for the San Francisco Maritime National Historical Park, 1991, p. 18.
1951	San Francisco Maritime Museum opens to the public on May 27, 1951.	United States Department of the Interior, National Park Service, "Draft General management Plan/Environmental Impact Statement, San Francisco Maritime National Historical Park," June 1996, p. 4.
October 1954	John E. Shields sells C. A. Thayer to Charles McNeal of North Lilliwaup, Washington.	Tri-Coastal Marine, Inc., Schooner C. A. Thayer Historic Structure Report 1991 Draft, Prepared for the San Francisco Maritime National Historical Park, 1991, p. 18.

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Year	Note	Citation
1954-1957	Charles McNeal exhibits the <i>C. A. Thayer</i> to the public as the pirate ship <i>Black Shield</i> , in a lagoon on his property among other tourist attractions he maintains.	Eric Lloyd Clements, "Historic American Engineering Record, Addendum to Schooner <i>C. A. Thayer</i> , HAER No. CA-61," September 1988, pp. 31-32.
1955-1957	Purchase negotiations are ongoing between Charles McNeal and the San Francisco Maritime Museum, supported by funding from the State of California, to purchase the <i>C. A. Thayer</i> .	Eric Lloyd Clements, "Historic American Engineering Record, Addendum to Schooner <i>C. A. Thayer</i> , HAER No. CA-61," September 1988, p. 32.
January 1957	State of California purchases <i>C. A. Thayer</i> from Charles McNeal for \$25,450.	Eric Lloyd Clements, "Historic American Engineering Record, Addendum to Schooner <i>C. A. Thayer</i> HAER No. CA-61," September 1988, p. 32.
1957	California state park unit named San Francisco Maritime State Historic Park established to display historic ships at Hyde Street Pier.	United States Department of the Interior, National Park Service, "Draft General management Plan/Environmental Impact Statement, San Francisco Maritime National Historical Park," June 1996, p. 4.
1957-1977	<i>C. A. Thayer</i> owned by State of California.	Tri-Coastal Marine, Inc., Schooner <i>C. A. Thayer</i> Historic Structure Report 1991 Draft, Prepared for the San Francisco Maritime National Historical Park, 1991, pp. 18, 24.
May-October 1957	Work completed in order to sail the <i>C. A. Thayer</i> to the San Francisco Bay conducted in Lake Union Drydocks, including: <ul style="list-style-type: none"> At the hull: forecastle sheer strake replaced at the port side, two bottom planks replaced at the starboard side, the keel repaired from the forefoot to 30 feet aft, 3,600 feet of seams recaulked, topsides sandwashed and painted, and bottom painted; At the stern: one new frame and three sister frames installed at port and starboard quarters, six new frames and four sister frames installed in the transom, one deck beam removed and a sister beam installed, 	Tri-Coastal Marine, Inc., Schooner <i>C. A. Thayer</i> Historic Structure Report 1991 Draft, Prepared for the San Francisco Maritime National Historical Park, 1991, pp. 19-20.

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Year	Note	Citation
	<p>deteriorated ends of additional deck beams cut off and steel angle supports installed, "horseshoe" timbers replaced along with covering board, bull rail, and caprail around stern, 119 feet of transom planking replaced, 136 feet of starboard quarter planking replaced, 66 feet of port quarter planking replaced, and new bitts installed at starboard quarter;</p> <ul style="list-style-type: none"> • At the forecastle head: bull rails and portions of rotting covering boards renewed, catheads and pawl bitts renewed, deck beam at the break of the forecastle and sister beam forward of pawl bitt renewed, decking in way of pawl bitt renewed; • Anchor windlass support timbers renewed; • Anchor windlass and gasoline donkey engine returned to working order; • Rerigging: new masts and bowsprit provided by the Spar Manufacturing Company of Seattle, old booms and gaffs retained, sails salvaged from the codfishing schooner Charles W. Wilson, spanker sheet horse taken from schooner <i>Beulah</i>, masts stepped and new rigging installed under supervision of master rigger Jack Dickerhoff, original spike bowsprit and "bald headed" type masts replicated, mizzen sail retained in the jib-headed configuration without mizzen gaff, square foresail not reinstated, turnbuckles rather than deadeyes and lanyards installed; and • Wheelhouse installed during codfishing era removed and original steering box reconstructed, with brass wheel installed during later codfishing period removed and replaced by cast iron wheel from the schooner <i>Azalea</i>. 	
October 1957	C. A. Thayer completes last sail down the Pacific Coast as the vessel is moved from Lake Union to San Francisco Bay.	Eric Lloyd Clements, "Historic American Engineering Record, Addendum to Schooner C. A. Thayer, HAER No. CA-61," September 1988, p. 32.
August 1958	Bottom work completed at Moore Dry Dock Company in Oakland, California; large steel gasoline and water tanks removed from the hold and replaced by wooden tanks from the schooner <i>Beulah</i> ; continued unspecified research, restoration, and interpretation work in preparation for public exhibition.	Tri-Coastal Marine, Inc., Schooner C. A. Thayer Historic Structure Report 1991 Draft, Prepared for the San Francisco Maritime National Historical Park, 1991, p. 20-22.
1959	Haul out and bottom work completed at Martinolich Ship Repair Company in Alameda, California; bottom cleaned and	Tri-Coastal Marine, Inc., Schooner C. A. Thayer

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Year	Note	Citation
	painted, draft numbers painted, and 25 feet of keel shoe replaced.	Historic Structure Report 1991 Draft, Prepared for the San Francisco Maritime National Historical Park, 1991, p. 22.
1960	Plans for restoration of the aft cabin developed over the course of conversations with Captain Ole Lee, who sailed and/or captained the <i>Thayer</i> c. 1915-1919. Restoration efforts returned the aft cabin to its original configuration with exception of extension of the passageway through what had been the Chief Mate's quarters through to the after companionway, in order to facilitate visitor circulation. This restoration reflects the current configuration of the aft cabin in 2020.	Tri-Coastal Marine, Inc., Schooner <i>C. A. Thayer</i> Historic Structure Report 1991 Draft, Prepared for the San Francisco Maritime National Historical Park, 1991, p. 22.
1961	During haul out, 50 feet of keel shoe replaced and mizzen crane iron repaired, along with routine cleaning and painting of the bottom.	Tri-Coastal Marine, Inc., Schooner <i>C. A. Thayer</i> Historic Structure Report 1991 Draft, Prepared for the San Francisco Maritime National Historical Park, 1991, p. 22.
October 1963	<i>C. A. Thayer</i> opens to the public at the San Francisco Maritime State Historic Park at Hyde Street Pier in San Francisco on October 2, 1963. Other vessels on display included the steam schooner <i>Wapama</i> , the scow schooner <i>Alma</i> , and the ferryboat <i>Eureka</i> . Interpretive information for the <i>C. A. Thayer</i> was developed by staff of the San Francisco Maritime Museum.	Tri-Coastal Marine, Inc., Schooner <i>C. A. Thayer</i> Historic Structure Report 1991 Draft, Prepared for the San Francisco Maritime National Historical Park, 1991, p. 22.
1963-1979	A haul out and maintenance and restoration schedule is developed for the <i>C. A. Thayer</i> with work occurring approximately every 3-4 years, although during these years the State of California struggled to provide the necessary money and manpower for the ship's demanding needs.	Tri-Coastal Marine, Inc., Schooner <i>C. A. Thayer</i> Historic Structure Report 1991 Draft, Prepared for the San Francisco Maritime National Historical Park, 1991, p. 22.
November 1966	<i>C. A. Thayer</i> designated a National Historic Landmark on November 13, 1966.	National Park Service, Western Division, "National Register of Historic Places Inventory Nomination Form, <i>C. A. Thayer</i> ," September 20, 1979 (entered), p. 1.
1969	While in drydock at the Pacific Drydock and Repair Company, the "whole stern is opened up," extensive planking is removed, and cant frame is renewed in bows.	Tri-Coastal Marine, Inc., Schooner <i>C. A. Thayer</i> Historic Structure Report

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Year	Note	Citation
		1991 Draft, Prepared for the San Francisco Maritime National Historical Park, 1991, p. 22.
1972	While in drydock at Merritt Ship Repair Company, hog at the keel is measured at 9 5/8 inches; some bottom planking renewed, and windlass brake repaired.	Tri-Coastal Marine, Inc., Schooner <i>C. A. Thayer</i> Historic Structure Report 1991 Draft, Prepared for the San Francisco Maritime National Historical Park, 1991, p. 22.
1975	While in drydock at Merritt Ship Repair Company, 367 linear feet of hull planking is replaced, keel shoe renewed, forward deck house roof renewed, new galley stove and flue installed, portions of stern bull rail, caprail, and covering board renewed.	Tri-Coastal Marine, Inc., <i>C. A. Thayer</i> Historic Structure Report 1991 Draft, Prepared for the San Francisco Maritime National Historical Park, 1991, pp. 22-24.
1977	The San Francisco Maritime State Historic Park and all of its ships including the <i>C. A. Thayer</i> come under management of the Golden Gate National Recreation Area, a newly established National Park. The vessel is visited by an average of 200,000 persons a year including (up until 2004) 12,000 school children taking part in the San Francisco Maritime State Historic Park's Environmental Living program and overnight programs.	Tri-Coastal Marine, Inc., Schooner <i>C. A. Thayer</i> Historic Structure Report 1991 Draft, Prepared for the San Francisco Maritime National Historical Park, 1991, p. 24; Michael R. Harrison, "NHL Schooner <i>C. A. Thayer</i> Historic Structure Report – Part III," Prepared for San Francisco Maritime National Historical Park, February 2020, p. 4.
1977-1998	Ongoing semi-regular haul-outs for both routine and emergency repair, maintenance and restoration. Seven surveys and preservation assessments over the course of this period of time document progressive and increasing deterioration of the <i>Thayer's</i> hull, with rot, damage from marine borers, and hog in the keel reported as the vessels' leading challenges.	Michael R. Harrison, "NHL Schooner <i>C. A. Thayer</i> Historic Structure Report – Part III," Prepared for San Francisco Maritime National Historical Park, February 2020, p. 5.
1977-present	<i>C. A. Thayer</i> is owned and overseen by the National Park Service.	Tri-Coastal Marine, Inc., Schooner <i>C. A. Thayer</i> Historic Structure Report 1991 Draft, Prepared for

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Year	Note	Citation
		the San Francisco Maritime National Historical Park, 1991, p. 24.
December 1978	<i>C. A. Thayer</i> is reported to have been taking on water at a rate of 36,000 gallons over a six-day period, and emergency haul out requested.	Tri-Coastal Marine, Inc., Schooner <i>C. A. Thayer</i> Historic Structure Report 1991 Draft, Prepared for the San Francisco Maritime National Historical Park, 1991, p. 24.
January 1979	During emergency drydock Merritt Ship Repair Company, 150 feet of hull planking replaced, 400 feet of seams recaulked, 102 feet of keel shoe replaced, protective sheathing of pressure treated Chemonite plywood over Irish felt was applied to the entire underwater surface.	Tri-Coastal Marine, Inc., Schooner <i>C. A. Thayer</i> Historic Structure Report 1991 Draft, Prepared for the San Francisco Maritime National Historical Park, 1991, p. 24.
1980	A survey conducted while the vessel was in drydock at Merritt Ship Repair Company noted 14 inches of hog at the keel, as well as extensive rot at the deck and upper frames, and at deck beam ends and covering boards, and worm damage at previous repairs.	Tri-Coastal Marine, Inc., Schooner <i>C. A. Thayer</i> Historic Structure Report 1991 Draft, Prepared for the San Francisco Maritime National Historical Park, 1991, p. 24.
1981	Mizzen mast removed as a safety precaution after extensive rot discovered during routine scraping. Inspection revealed extensive rot at the fore and main masts as well; new masts ordered from Intermountain Orient Co. of Boise, Idaho.	Tri-Coastal Marine, Inc., Schooner <i>C. A. Thayer</i> Historic Structure Report 1991 Draft, Prepared for the San Francisco Maritime National Historical Park, 1991, p. 24.
January 1981	Storm parts the stern offshore anchor chain and causes damage to 20 square feet of hull planks on the starboard side at five feet above the waterline.	Tri-Coastal Marine, Inc., Schooner <i>C. A. Thayer</i> Historic Structure Report 1991 Draft, Prepared for the San Francisco Maritime National Historical Park, 1991, p. 24.
1982	Winter storm parts the bow anchor chain and stove in eight planks amidship.	Tri-Coastal Marine, Inc., Schooner <i>C. A. Thayer</i> Historic Structure Report 1991 Draft, Prepared for

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Year	Note	Citation
		the San Francisco Maritime National Historical Park, 1991, p. 24.
Fall 1982-January 1984	Drydock repair at Pacific Drydock and Repair Company, including 600 linear feet of four inch thick pressure treated planking, varying in width from four to 10 inches, installed to replace storm-damaged and rotten topside planking on the starboard side, at the quarter and amidship; fore and main masts removed; masts replaced with new spars from Intermountain Orient Co.; existing rigging installed on new spars, along with new hemp lanyards; bowsprit replaced after rot-related break.	Tri-Coastal Marine, Inc., Schooner <i>C. A. Thayer</i> Historic Structure Report 1991 Draft, Prepared for the San Francisco Maritime National Historical Park, 1991, p. 24.
1983	<i>C. A. Thayer</i> oversight transferred to Maritime Unit of the Golden Gate National Recreation Area.	United States Department of the Interior, National Park Service, "Draft General management Plan/Environmental Impact Statement, San Francisco Maritime National Historical Park," June 1996, p. 5.
1987	<p>Responding to deterioration noted in a 1984 survey, work was completed on the topsides, main deck, and bulwarks. Work performed under contract with Richardson Bay Boatworks and Ways included:</p> <ul style="list-style-type: none"> • Refastening 23 sprung topside plank butts; • Replacement of 66 linear feet of topside planking at port side; • Recaulking of selected seams, with seams at port and starboard topsides treated with Hydroseal (a bitumastic sealant); • Port and starboard topsides painted black; • Deteriorated bulwark stanchions repaired and replaced (repairs used cement and dutchmen, while replacement stanchions were non-structural); and • Bolster installed on the starboard quarter for shifting the stern mooring line to reduce hogging strain. <p>Work performed by the NPS included;</p> <ul style="list-style-type: none"> • Replacement of two starboard forward rotten deck planks; • Recaulking of select deck seams; and • Paying all seams with marine glue (pitch). 	Tri-Coastal Marine, Inc., Schooner <i>C. A. Thayer</i> Historic Structure Report 1991 Draft, Prepared for the San Francisco Maritime National Historical Park, 1991, p. 25.
June 1988	San Francisco Maritime National Historical Park becomes a separate administrative unit of the National Park Service.	United States Department of the Interior, National Park Service, "Draft General management

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Year	Note	Citation
		Plan/Environmental Impact Statement, San Francisco Maritime National Historical Park," June 1996, p. 5.
January 1989	<p>C. A. Thayer hauled out at Pacific Drydock and Repair Company and repaired, including</p> <ul style="list-style-type: none"> • Renewal of 65 linear feet of worm-damaged and rotten planking at and just below the waterline at the starboard side, amidship; • Removal of rudder and steering gear; removal of all plywood sheathing along the waterline and ten additional sheets of plywood at various locations on the bottom; • Extensively deteriorated outer "sacrificial" worm shoe removed, copper sheathing applied to remaining worm show and keel; and • Relocation of sea suction thru-hull fitting from starboard to port side, new fitting and sea cock installed. <p>The keel was measured prior to haul out and 14 1/4-inch hog was observed.</p>	Tri-Coastal Marine, Inc., Schooner C. A. Thayer Historic Structure Report 1991 Draft, Prepared for the San Francisco Maritime National Historical Park, 1991, pp. 25-26.
1989	New lathe-turned Douglas fir spar outfitted with fittings and jaws from the old boom and installed.	Tri-Coastal Marine, Inc., Schooner C. A. Thayer Historic Structure Report 1991 Draft, Prepared for the San Francisco Maritime National Historical Park, 1991, p. 26.
1989-2002	Ongoing discussions of appropriate approach to preservation of the Thayer. A 1989 preservation workshop advocated for maximum retention of existing historic material in order to protect the historic integrity of the resource. A 1991 conditions assessment considered four scenarios ranging from loss of the vessel to extensive restoration with in-kind replacement of deteriorated materials. A 1991 preservation committee meeting advanced the idea that ships in their active lives were <i>subject to ongoing repair, and that ongoing restoration of the Thayer</i> could therefore replace historic materials in-kind without suffering a loss of integrity. These findings were restated in a 1999 planning document issued by the National Park Service in 1999, and further advanced in a 2002 environmental assessment document issued by the National Park Service for the rehabilitation of the Thayer.	Michael R. Harrison, "NHL Schooner C. A. Thayer Historic Structure Report – Part III," Prepared for San Francisco Maritime National Historical Park, February 2020, pp. 4-8; Tri-Coastal Marine, Inc., Schooner C. A. Thayer Historic Structure Report 1991 Draft, Prepared for the San Francisco Maritime National Historical Park, 1991, p. 1.

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Year	Note	Citation
1991	Conditions assessment finds that the C. A. Thayer is in an advanced state of deterioration and will require major structural repairs	Tri-Coastal Marine, Inc., Schooner C. A. Thayer Historic Structure Report 1991 Draft, Prepared for the San Francisco Maritime National Historical Park, 1991.
1997	Mainmast removed due to rot.	C.A. Thayer masts and bowsprit memos and surveys, 1997, in the resource management collection of the San Francisco Maritime National Historical Park.
2003-2007	<p>Multi-year restoration effort conducted by Bay Ship and Yacht in Alameda included the following actions:</p> <ul style="list-style-type: none"> • Two remaining masts, bowsprit, capstan, anchor windlass, anchors, and anchor chains removed; • Fisherman's forecastle dismantled and removed to museum storage except for its deck; • Forward-most six feet of the forward deckhouse, determined to be original, removed and stored, while remainder of forward deckhouse, dating from the 1940s, demolished; • Hull laser scanned; • Deck planking, bulwarks, and topside planking removed, and fastening pattern of the trunnels on the few remaining original planks noted in order to replicate when new planking was reinstalled; • 80- to 90-foot length old-growth timber bottom planking found to be generally free of rot and retained; • Ceiling planking below the turn of the bilge removed and replaced; • Forward 40 feet of 4-inch thick wormshoe replaced; • Futtocks removed, and new futtocks built using method of individual patterning and shaping for exact replication of replacement futtocks; • Upper sister keelsons and keelsons removed; • Stern reconstructed including new upper section of the stern post, new rudder trunk, strong quarter knees, and full ceiling planking installed to reinforce upper aft section of the bulwarks; • Transom, which was shortened six inches in the 1940s, restored to original design; • 48 original hanging knees repaired with old-growth Douglas fir where necessary; two hanging knees 	Michael R. Harrison, "NHL Schooner C. A. Thayer Historic Structure Report – Part III," Prepared for San Francisco Maritime National Historical Park, February 2020, pp. 15-21

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Year	Note	Citation
	<p>shaped new. Each knee was treated with 20% Borate salt solution to protect against rot. Old fastening holes infilled with dowels and new holes were drilled for new fasteners;</p> <ul style="list-style-type: none"> • Diagonal point timbers at bow and stern removed for eventual replacement; • Renewal of thick ceiling planking in kind with 80-foot lengths of 8-inch fir through the middle of the hull, and double layers of 4-inch thick plank, following the original design, at the fore and aft sections. Pattern and amount of fastening was also reproduced; • Sheer clamp timbers, which originally used single timbers that were 114 feet long and 14 x 12 inches in section, replaced with 42-foot length timbers scarf jointed together; • Hull planking replaced with four-inch thick fir, based on documentation of original layout (both planking and fasteners), but with adjustments made to suit the widths of the replacement material, using 80-foot planking in many areas; • Deck beams replaced except for main deck nos. 1 and 2 and nos. 35-41 under the afterhouse, and forecastle deck nos. 1-7. Deck camber determined to be inconsistent: new camber of 3.5 inches selected and sawn into the top surface of each beam, replicating the technique at original construction; • 17 original hold iron stanchion brackets retained, rehabilitated and reused, and nine replica brackets fabricated and installed; • Cargo hatches returned to original sizes, spanning four deck beams each; • Original waterway timbers, up to 80 feet in length, removed and replaced with smaller lengths scarf jointed together. Waterway timbers were sawn into shape from wider stock, based on original construction techniques to maximize strength, and notched to fit over the ends of deck beams and into bulwark stanchions; • Deck planking restored using 4 x 4-inch Douglas fir planks in 40 foot lengths, with a bevel planed into one edge to accommodate caulking; • Deck and hull planking caulked using traditional working techniques and materials. All seams filled with cotton and oakum, topside seams finished with a tar-like seam compound; seams below the waterline 	

C. A. Thayer Chronology/Research Notes		
Year	Note	Citation
	<p>finished with Portland cement; seams in the deck finished with marine glue;</p> <ul style="list-style-type: none"> Hull and bulwarks painted by hand with roller and brush to simulate authentic look and texture; Afterhouse moved in order to allow for hull access; interior paneling and fittings dismantled and stored; new starboard ends scarfed onto three rotten beams under the afterhouse, and original deck planks inside the afterhouse preserved; and Bulwark planking and rail cap installed under separate funding sources. 	
2008	Rehabilitation work on the exterior of the afterhouse is begun; scope of work unknown.	Michael R. Harrison, "NHL Schooner <i>C. A. Thayer</i> Historic Structure Report – Part III," Prepared for San Francisco Maritime National Historical Park, February 2020, p. 22.
2011	<p>San Francisco Maritime National Historical Park acquired components of the <i>Wawona</i>, the only other surviving West Coast lumber schooner, which was dismantled by its owners in 2009. Components acquired to replace missing or damaged equipment on the <i>Thayer</i> included:</p> <ul style="list-style-type: none"> Rudder head clamp fitting; Steering gear; Port and starboard bilge pumps and one pump handle; Bronze port light from forward deckhouse (to be used as a pattern for fabrication of new lights); Windlass crosshead (did not match <i>Thayer</i> and was not used); and Galley freshwater hand pump. <p>Rigging components and sail fragments acquired to inform fabrication of new components, including block, sheet bails, boom end goosenecks, spar bands (hinged and unhinged), stay bails, sail hanks, parrel beads, shackles, spectacle irons, sail corner ring and thimbles, and sister hooks.</p>	Michael R. Harrison, "NHL Schooner <i>C. A. Thayer</i> Historic Structure Report – Part III," Prepared for San Francisco Maritime National Historical Park, February 2020, p. 22.
2012	<p>Additional hull restoration work completed at Bay Ship and Yacht in Alameda including:</p> <ul style="list-style-type: none"> Fabricating, fitting and installing missing sections of the lower sister keelsons and upper sister keelsons inside the hull; Dubbing and fairing the futtocks in way of the thin ceiling; Fabricating, fitting, and installing missing areas of the thin ceiling: Ship Plank-grade Douglas fir was not 	Michael R. Harrison, "NHL Schooner <i>C. A. Thayer</i> Historic Structure Report – Part III," Prepared for San Francisco Maritime National Historical Park, February 2020, pp. 23-24.

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	<p>available from any supplier and Select Structural, Free of Heart Center-grade Douglas fir used instead;</p> <ul style="list-style-type: none"> • Fabricating, fitting and installing pointers, four at the bow and two at the stern. The original #1 port and starboard pointers and the breasthook knee for those pointers were retained in 2007 to be used as patterns for accurate replacements. However, a 2011 inspection determined these components were sound, and they were reinstalled; • Horsing the poop, main, and forecastle decks; • Drydocking the ship for hull cleaning and painting; • Repairing hull planks as needed; • Reefing and Recaulking hull seams and butts as needed; • Rudder blank created by park staff, shaped, fitted, coated, and installed by Bay Ship and Yacht; and • Original deteriorated steering gear removed and placed in museum storage; <i>Wawona</i> steering gear installed and new steering-gear box fabricated and installed over the gear on the poop deck. 	
2014	Skylight atop the afterhouse was restored by shipwright Jeffrey Vallely.	Michael R. Harrison, "NHL Schooner <i>C. A. Thayer</i> Historic Structure Report – Part III," Prepared for San Francisco Maritime National Historical Park, February 2020, p. 24.
2015-2019	<p>Multi-year restoration effort of the <i>C. A. Thayer's</i> rigging conducted by Bay Ship and Yacht in Alameda and park staff at Hyde Street Pier included the following actions:</p> <ul style="list-style-type: none"> • Fabrication of laminated masts, spars, and associated ironwork; • New mast trucks and parrel beads fabricated from lignum vitae due to unavailability of ironbark as historically used; • Hull cleaning and antifouling painting; • Some areas of the underwater hull planks, aft deadwood, rudder, and aft wormshoe replaced after damage from marine borers discovered; • New bull rails, bull rail cap, stanchions, and taffrail installed around the poop deck; • Anchor lining planks added to the bulwarks on either side of the bow; • New chain plates fabricated and installed athwart the mast locations; • New catheads installed; • Gammoning knee, including fiddlehead, fabricated, carved, painted and installed; 	Michael R. Harrison, "NHL Schooner <i>C. A. Thayer</i> Historic Structure Report – Part III," Prepared for San Francisco Maritime National Historical Park, February 2020, pp. 26-28.

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Year	Note	Citation
	<ul style="list-style-type: none"> • New bowsprit stepped; • New masts stepped following preparatory work including cutting mast step for the foremast and repairing the mast steps for the main and mizzen masts, and cutting circular openings through the deck planking to allow for all three masts to pass; • New pin rails installed along the bulwarks and the shrouds partly set up; • At Hyde Street Pier, park staff rigged the gaffs and booms with peak halliards, throat halliards, and sheets; spliced the deadeyes to the shrouds on all three masts and served the lower sections of the shrouds; rigged the headsails to the stays along with the required running rigging; applied slush and tar to all rigging as a preservative measure following historic practice; and fabricated and installed canvas mastboots to cover masts where they pass down through the deck; • Staysail boom topping lift rerigged based on new analysis of historic photos; • Davits rigged and painted; • All blocks removed, dismantled, and soaked in a mixture of tar and linseed oil (performed annually); • Spars slushed in a mixture of tar and linseed oil (performed annually); and • Service received two coats of Stockholm tar (performed annually). 	
2019	Additional restoration work began to complete the afterhouse including installation of the windows and slide shutters and reinstallation of the interior paneling.	Michael R. Harrison, "NHL Schooner C. A. Thayer Historic Structure Report – Part III," Prepared for San Francisco Maritime National Historical Park, February 2020, pp. 28-29.
2020-2021	Last phase of restoration of the C. A. Thayer, including: <ul style="list-style-type: none"> • Maintenance of the hull including hull planking and worm shoe repairs, cleaning, and painting; • Restoration of hatch covers for the lumber port openings through the transom; • Reconstruction of lumber loading platform in the hold aft; • Reconstruction of chain locker at bow in hold; • Repair and replacement of areas of the bull rail; • Installation of about 25 feet of new salt box in the hold; • Replacement of the end grain with graving pieces where the transoms beams have deteriorated; • Painting of the steering wheel and steering-gear box; 	Michael R. Harrison, "NHL Schooner C. A. Thayer Historic Structure Report – Part III," Prepared for San Francisco Maritime National Historical Park, February 2020, pp. 29-30.

C. A. Thayer Chronology/Research Notes		
Year	Note	Citation
	<ul style="list-style-type: none"> • Carving of name, home port, and decorative scroll on transom; and • Restoration and reinstallation of the windlass. 	
	<p>Remaining work to be done by SAFR shipwrights includes:</p> <ul style="list-style-type: none"> • Fabrication of louvered ventilation hatches for alternative use in the chute openings; • Ongoing investigation into appropriate (if any) style and location of draft marks for potential replication; • Restoration of the forward deckhouse to original footprint and approximately historical internal layout including four compartments including a forecabin with six berths forward, a galley and cook's room in the middle, and a donkey engine room aft; and • Restoration and reinstallation of the galley stove. 	

Appendix E

Extended List of Character-Defining Features

As a supplement to the list of character-defining features included in Section Six: Evaluation of Significance, staff of the National Park Service has prepared the following list which further delineates specific components of the character-defining features of the *C. A. Thayer*.

- Pole masts with gaff topsails;
- Colman hooks for the topsail sheets;
- Swiveling topsail sheet blocks on the ends of the gaffs;
- Round mast trucks;
- Peak halliard block strap construction;
- Lower sheet block egg-shape;
- Hyde Windlass Company capstan;
- Leather fairleads for halliards;
- Jigger block sticks for travelers on the backstays;
- Lumber load pin rails and associated halliard hooks and extensions for jiggers;
- Sail bending battens on the bottom of the gaffs;
- Canvas and rope sail ties;
- Bilge pump box (pending installation);
- Protective boxes around the mast boots;
- Chafe battens on deckhouse;
- Mizzen sheet horse protective wood (pending installation);
- Built knee in the stern of the ship (lumber loading platform);
- Long lengths of high-quality Douglas fir used in the original construction for all components, including keel, keelsons, futtocks, planking, ceiling, hanging, breast and lodging knees, beams and stanchions, decking, deck houses, rudder, bowsprit, masts, gaffs, and booms;
- Trunnel fastening with steel fasteners in the ceiling;

- Use of ironbark from Australia (an established lumber route for Pacific coast and Northwest timber at the time of ship's construction);
- Windlass and capstan from East Coast and locally built donkey steam engine hoist;
- Carved redwood wood paneling and faux graining to resemble hardwood in the captain's cabin and salon of the aftcabin; and
- Shoal draft, stout construction for crossing bars.

Appendix F

Fire Protection Report

**United States National Park Service
San Francisco Maritime National Historical Park
Vessel *C.A. Thayer*
San Francisco, California**

**Fire Protection Analysis
August 2021, revised October 2021**

Introduction

The *C.A. Thayer*, which is a part of the vessel collection at San Francisco Maritime National Historical Park, is a three-masted, bald-headed schooner that was constructed in 1895 and worked in the Pacific west coast lumber trade. The ship is constructed of Douglas Fir with an overall length of 168'-6" and beam of 36'-4". It has two decks, a 11'-8" cargo hold and an open main deck with a fore and aft deck house. Historically the deck houses served as crew quarters, cooking facilities and crew dining. Currently the hold is empty and the deck houses are used for historic interpretation. Safeguarding this historically significant ship from fire is a key element of the ongoing preservation program.

Fire Risk

Examination of the *Thayer* reveals that there are three primary fire compartments: the hold (lower deck), and the forward and aft deck houses that are located on the main deck.

The hold is a single large compartment that runs the vessel's full length and beam. It is constructed of large wood planks and is comparable to land based heavy timber or "mill" construction, which is a construction style that is inherently slow burning and fire resistant. Fire spread for this style of construction is not impossible but a fire ignition does require a prolonged flame exposure, and when this happens a surface char layer will form to further resist fire propagation. There are currently few additional combustible contents (fuels) on the deck.

The Park has long maintained a policy of treating the wood elements of the *Thayer* with a Octaborate Tetrahydrate solution. Borate products are one of the main ingredients for a number of intumescent fire retardants and sealants, that are produced to retard surface flame spread and prevent deep burning of wood fibers. Flame spread is based on the rate that a flame front will extend in a standardized ASTM E84 tunnel test with results on a scale from 0 to 200, with 0 representing no surface flame spread. For example brick is a 0 rating while non fire treated plywood is 185.

Materials are then classified as Class I (A) flame spread 0-25, Class II (B) 26-75 and Class III (C) 76-200 and these classifications indicate where different materials may be used in the building areas. Class I and II are typically required for egress routes that must withstand fire duration for the longest time periods. Untreated Douglas Fir has a rating of 90 which places it on the lower half of a Class III rating. Fire treating plywood improves the rating from 185 to 25 (Class III to Class I). The Park Service preservation treatment of the *Thayer* is expected to yield similar results for the Douglas Fir and provide a minimum Class II and likely Class I rating. This will significantly reduce the initial rate of surface flame spread.

There are few potential ignition sources on the hold deck with the electrical and lighting circuits, and the bilge pump representing the primary risks. The power circuits are contemporary cable and ground fault protected. Communications with staff indicated a preference to convert all lighting to low voltage LED equipment.

Based on current use, the probability of an accidental fire is low and if one should occur a fire will grow at a “slow” rate, as defined by the Society of Fire Protection Engineers (SFPE).



Photo 1. The hold construction is similar to a land-based heavy timber style. This can be difficult to ignite and when ignition does occur, the fire will initially burn along the surface to form a char layer that helps to insulate the timbers from further fire damage. The borate treatment that the Park applies for wood preservation will also function as an intumescent treatment to retard the initial rate of fire spread. The Thayer's hold does not contain a sizable amount of combustible contents that could produce a fast growing fire. The present fire risk is extremely low.

The present situation could be altered if in the future the deck is fitted with simulated cargo displays, similar to those on the adjacent Balclutha. At that point the fuel loads would be significantly increased to produce an SFPE rated medium to fast growth fire of 30-60 minutes duration.



Photo 2: The hold on the adjacent Balclutha has a different situation where simulated cargo displays pose a higher quantity of readily ignitable fuels that could result in relatively fast fire spread throughout the vessel. If a similar display arrangement is eventually placed on the Thayer, then the fire threat to the vessel will significantly increase.

The Thayer's fore and aft deck houses are lighter weight wood construction, comparable to a land based type 5 wood framed construction. If ignited the anticipated fire growth rate is SFPE that if moderate and capable of producing a fire of 30-45 minutes duration. This type of fire could ignite rigging and travel vertically up mast assemblies. The probability of an initial lateral fire spread across the main deck is low but could be increased by burning rigging materials raining down on the decks.



Photo 3: The deck houses are lighter wood framed construction and pose a potential moderate fire growth rate.

Ignition sources within the deck houses are relatively low, consisting primarily of electrical circuits. The deck houses are being rehabilitated and it is expected that they will be compliant with contemporary electrical installation standards. Ironically the highest ignition threats exist at the present time with temporary construction lighting, electrical tools, battery chargers, and the treatments that are being used. It is recommended that tool battery chargers be used off of the vessel and combustible liquids be housed off ship when they are not being applied.

The main ignition concern on the Thayer is unauthorized entry and vandalism, and specifically the potential for an arson situation. The most significant fire would occur if some form of accelerant, i.e. gasoline, is used. As with an accidental fire, there would be a slower fire spread in the hold deck and faster in the deck houses.

Managing the fire risk to prevent fire ignition is the single most important component of the Thayer fire protection program and the following fire prevention measures are recommended:

- Replace existing lighting with low voltage LED equipment.
- Place the bilge pump in a fire resistant steel cabinet to add an extra level of physical separation between this possible ignition source and the ship's combustible decking.



Photo 4: The bilge pump is one of the higher ignition threats but this hazard can be controlled by placing the pump in a metal cabinet to prevent the pump from contacting the wood elements.

- Reduce the threats from construction activities by removing all flammable and combustible liquids from the vessel during non-work periods. Tool batteries should be recharged off vessel.
- Provide locking equipment on the door that leads from the main deck down into the hold and the doors that enter the deck houses. The objective of these locks is to delay an intruder from entering these spaces while law enforcement responds. In many instances the presence of locks will be enough to deter an intruder so that they stop the intrusion attempt.

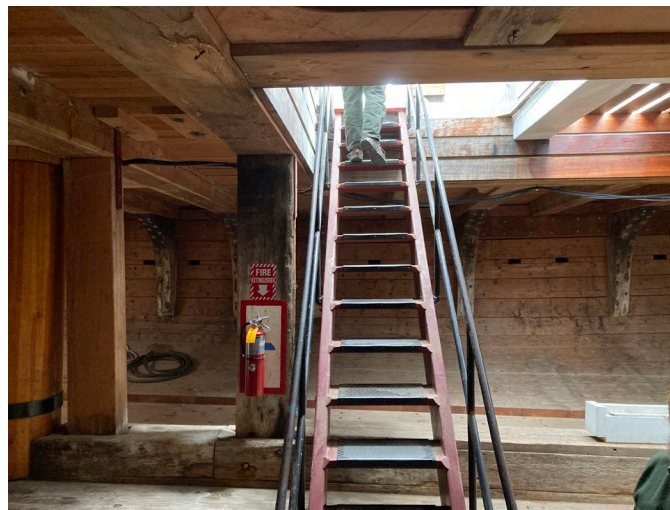


Photo 5: The doors that lead to the hold deck and into each deck house should be fitted with appropriate locking to delay unauthorized intrusion.

- Install smoke detection throughout the hold and within the deck houses and integrate the detector control panel with the electrical circuits to de-energize circuits and stop the accidental ignition source if smoke is detected. The appropriate smoke detector for the vessel is an air sampling system (commonly referred to as VESDA).

The air sampling smoke detection system functions by drawing a constant air flow from sampling points within the protected space, through a tubing network and into an air analyzing chamber where, if present, particles of smoke will be detected. The smoke analyzing chamber is connected to a fire alarm control panel that will in turn raise the alarm on the vessel and to an off site monitoring station. The monitoring station will have responsibility for notifying NPS staff and the fire department. The smoke detection system components are as follows:

- Detection module. This is the main control and analyzing component of the system. It can be located just about any inside place on the Thayer and the most feasible current place would be near the bilge pump where electrical service is available to power the unit.
- Main detection tube. From the detector will run a 0.75 inch (18mm) main tube that will run the length of the vessel and up into the forward deck house. It can be routed below the hold deck boards adjacent to the top of the keelson. A number of tube materials can be used for the main tube including type k copper, CPVC plastic, or HDPE (pex) plastic tube.
- Capillary sampling tubes. From the main tube will run a series of 0.25 inch (6 mm) flexible plastic tubes. These will terminate at sampling points in the respective protected area. For example on the hold deck they can be routed under the deck floor between the futtocks and to the vent ports that are located on the hold walls. These sample points will be located every approximate 20 -25 feet (6.1-7.6 m) as defined by the vent placement. Sampling points can be placed within the vent shadows to minimize visual impact. Additional capillary tubes will be run vertically into the two deck houses and integrated into deck house framing to minimize visibility.
- Fire alarm control panel. The air sampling detection unit will report to a control panel that in turn has responsibility for raising the alarm for those on the vessel, NPS off vessel staff and the fire department. The control panel can also be placed near the bilge pump.
- Alarm notification. Notification for the vessel occupants will be accomplished by four alarm horn and strobe devices – two in the hold and one each per deck house. These can be integrated to the vessel components to minimize visual impact, i.e. behind the hold's ceiling framing. Communication with the central monitoring station and NPS staff can be accomplished via cellular link.
- Power supply. The power supply for the fire alarm control panel and air sampling smoke detector is achieved with dedicated 120 volt, 20 amp AC circuits, and this power will be provided by the electrical service that is on the vessel. However the actual systems utilize 24 volt DC power which is converted by each component, and batteries are used as backup power when main service is disrupted. The standby power charge in batteries is accomplished by the main service. If the Thayer is taken from the dock, resulting in the main power disconnection, the batteries will be sized to supply power to the control panel and smoke detector for a 24 hour period with longer duration available if desired. These batteries can be arranged to be recharged by a solar unit that would be mounted on one of the deck house roof sections.
- Electrical system interface. The fire alarm system will be interfaced with the vessels electrical circuits to shut power down if smoke is detected.



Photo 6: The air sampling smoke detection main tube can be routed under the floor adjacent to the keelson, and the individual sampling tubes run under the floor to the air vents.

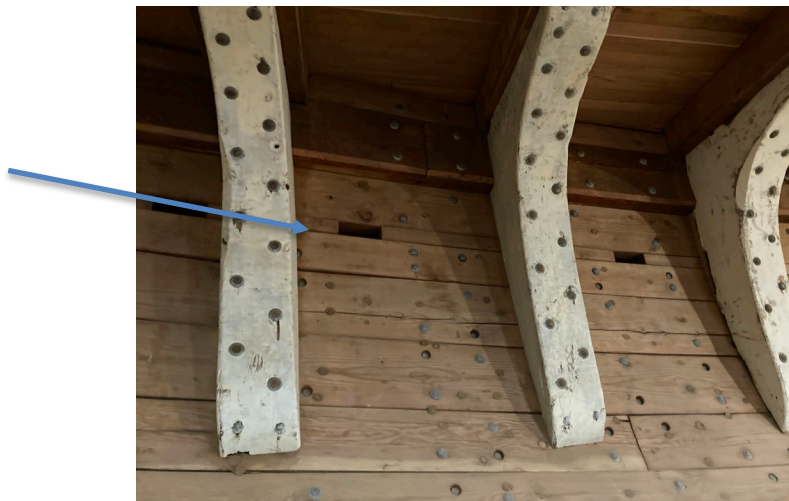


Photo 7: The sampling tubes (0.25 inch/8 mm) can be routed between the futtocks and placed in the shadows of the air vents.

- Install a security monitoring and detection system to identify unauthorized entry and send a notification to NPS staff, and appropriate law enforcement agencies.

The basic components of the vessel security system will be as follows:

- Cameras. Cameras can serve multiple purposes including identifying when someone enters the field of view (video motion detection), observation of the intruder's motions, and smoke/fire detection. The cameras for the vessel will be IP based-digital units that are selected for the desired location and field of view. There are numerous camera products available that range from large and obvious dome units to very discreet micro units. For the Thayer two mini dome units, placed one each on the two deck houses and aimed toward the center of the vessel should provide reasonable identification of movement onto the vessel. Two additional cameras should be placed on the hold deck to scan the deck for occupants. It

would be appropriate to mount a larger dome camera on a post along the wharf as an obvious monitoring device that can serve as a deterrent to those who may want to enter the space when the vessel is closed.



Photo 8: Security cameras can be placed at each deck house to scan the decks for unauthorized intrusion. There is quite a bit of latitude on camera placement and the final locations will be determined during the detailed design phase.

- Network switch/video recorder/communication unit. All cameras will be cabled back to a main network switch and event recorder. This unit can be placed just about anywhere on the vessel, with one option adjacent to the fire alarm control panel. Communication to NPS staff and appropriate law enforcement agencies can be cellular. Power for the equipment will be via a dedicated 120 volt, 20 amp circuit with battery backup, similar to the fire detection system.
- Notification/alarm. With cultural property security there are two philosophies for alarm notification. The first is to have a silent alarm transmission to law enforcement, providing a quiet opportunity for law enforcement to respond while the intruder is on the premises. The second is to activate an obvious alarm sounder and visual device that lets the intruder know that he has been detected. The preferred approach will need to be determined by NPS administration and law enforcement. With the possibility that a law enforcement response may take several minutes by which time a sizable amount of damage could result, the later option is probably preferred to scare the intruder from the vessel before damage.
- Cable. All cameras will be low voltage power over Ethernet (PoE) powered. Power and data transmission from cameras to the network switch will be over cat 6 cable, placed to minimize aesthetic impact.

Fire Suppression

As originally intended, the primary purpose of this analysis is to identify an appropriate automatic fire suppression system for the vessel. The options for the Thayer are standard pressure water fire sprinklers and high pressure water mist sprinklers.

- Standard pressure sprinklers will utilize thermal bulb nozzles that activate when higher than average heat occurs (i.e. 165°F/57°C). They will be spaced at nominal 12-16 foot (3.6-4.9 meter) intervals and water to each nozzle provided by copper tube with diameters ranging from 1.0-3.0 inches (25-75 mm). The

necessary quantity of water will be approximately 150 gallons (568 liters) per minute and will be provided by a hose connection to the municipal main. Since these sprinklers apply water on a two dimensional principle, they must be carefully spaced so that all combustible surfaces can be wetted by sprinkler operation. Subsequently there is less design and installation latitude, a probable higher number of sprinklers and potentially greater visual impact. The system will only function when the vessel is docked.

- High pressure water mist sprinklers also utilize thermal bulb nozzles that activate under higher temperatures. Mist nozzles will be spaced at nominal 13-16.2 foot (4.0-5.0 meter) intervals and water to each nozzle provided by stainless steel tube with diameters ranging from 0.5-1.0 inches (12-25 mm). The necessary quantity of water will be approximately 3.9 (15 liters) gallons per minute. This will be provided by 150 liter water and nitrogen cylinder sets with each cylinder set capable of supplying 4 nozzles for 10 minutes. These sets operate independent of electrical power or other water supplies and are designed for marine applications. Water mist applies water on a three dimension principle, which allows greater nozzle placement latitude since the objective is to fill the space with a dense cloud. Subsequently there a lower number of nozzles may be needed to protect a given area and the visual impact will be less. The system will function when the vessel is docked or at sea.

Water mist has an extensive history protecting marine vessels and is the recommended choice for the Thayer. The system will consist of the following components:

- Water/Nitrogen Cylinder Set. Based on the highest present fire hazard, two cylinder sets of approximate dimension 450 mm wide x 1500 mm long (18 inches x 60 inches) long will be recommended. The largest anticipated fire area will require a maximum of four simultaneous operating nozzles and the two cylinder sets will provide water for approximately 20 minutes. This is expected to fully suppress the fire and allow the fire department or NPS staff to respond and complete full extinguishment. If extended time is desired then additional cylinder sets can be installed. They may be located on the hold deck or integrated into one of the main deck houses.
- Nozzles. Thermal bulb low profile wall or ceiling mounted. Spacing 4-5 meters. Color matched to existing fabric colors.
- Tube. High pressure stainless steel 12mm – 25 mm diameters.
- Releasing valve. The tube will have a low level monitoring pressure constantly applied. When the pressure falls due to the opening of a sprinkler nozzle, this loss of pressure will activate a releasing valve that in turn allows the water nitrogen blend to flow to the burning compartment. This valve is located at the cylinder sets.
- Fire alarm interface. A flow sensor will be integrated with the fire alarm system to provide notification when the system operates.

With the present fuel and combustibility factors on the Thayer it is difficult to justify installing suppression on the entire vessel. The probability of a fire becoming hot enough to activate the mist nozzle release is highly unlikely. However there is adequate opportunity for a fire to reach mist sprinkler operating temperatures in the two deck houses and therefore adding mist protection to these spaces is appropriate.

There are two water cylinder options for the deck houses – one water/nitrogen cylinder set each for the fore and aft sections of the ship or, a two sets at a single location on the hold deck near the bilge pump. This later option would be preferred to provide the full 20 minute duration for a fire in either deck house. The hold placement option will include a 25 mm main tube that runs the length of the ship to each deck house. If the fuel loads on the hold deck change, as would occur if the hold is fitted with replicas of a ship's cargo, the mist system will need to be extended to include the entire hold. This would present an opportunity to integrate the automatic fire suppression system into the displays, thereby avoiding visual impact on the

vessel's fabric. The added fuel load will require additional fire suppression supply that will consist of a compressed nitrogen powered pump, approximately 12 compressed nitrogen cylinders and a storage tank of approximately 500 gallons (1,890 liters). These can be integrated into areas behind the displays. Looking at a similar display example on the adjacent Balclutha, the fire suppression system could be readily integrated into the displays.



Photo 9: If the entire hold, in its present arrangement, of the ship is water mist protected then a main tube will run along the approximate center and 12 mm branch lines will be routed from the main to the nozzles. If the deck houses alone are protected and a single cylinder set is located on the hold deck, the 25 mm main tube will follow a similar route, or may be integrated along the keelson and run vertical into the deck houses.



Photo 10: The water mist nozzles may be ceiling or wall mounted with tube integrated into wall fabric or surface mounted to minimize visual impact. The tube diameter for an individual nozzle will be 12 mm.



Photo 11: Mist nozzles apply water in a three dimensional mode which creates a cloud like spray. This allows greater flexibility than standard sprinklers. A nozzle integrated into the grates could cover the fire hazard within this entire deck house space.

Fire Protection Summary

To summarize the fire protection aspects of the CA Thayer:

- The current risk of fire reaching a significant size on the hold deck is extremely low. There is currently not an adequate fuel load to activate a sprinkler heat sensing element.
- Installing an air sampling smoke detection system will identify a smoldering fire at its earliest phase. This will allow time for NPS staff to investigate and stop the smoldering fire incident. The smoke detection system will be interfaced with the vessel's electrical circuits to power them off when smoke is identified.
- Arson is the most likely fire threat to the vessel. A security camera array with video motion detection and direct notification to appropriate NPS and law enforcement agencies is recommended to identify unauthorized intrusion at the earliest moment.
- Install a water mist fire suppression system for the two main deck houses. This will be supplied by compressed water/nitrogen cylinder sets.
- If the hold fuel load changes, as would occur if the deck is outfitted with exhibits similar to the Balclutha, a fire suppression system will be needed. This may be integrated into the display to minimize impact on the ship's fabric.

Appendix G

The Secretary of the Interior's Standards for Historic Vessel Preservation

General Standards for Treatment of Historic Vessels

1. A historic vessel shall be put to a use, either continuing or new, that requires minimal change to its historic qualities and appearance.
2. The defining characteristics of a vessel shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a vessel shall be avoided.
3. Each vessel shall be recognized as a physical record of its time, place and use. Changes that create a false sense of historical development, such as adding conjectural features or architectural elements from other vessels, shall not be undertaken.
4. Most vessels change over time; those changes that have acquired historical significance in their own right shall be retained and preserved.
5. Distinctive features, finishes, and construction techniques or examples of craftsmanship that characterize a vessel shall be preserved.
6. All vessels shall be subject to a program of preventive maintenance. Deteriorated historic features and their materials shall be repaired rather than replaced. Where the severity of deterioration requires removal of a distinctive feature, the replacement shall match in design, color, texture, and other visual qualities; and, where possible, material. Replacement of missing features shall be substantiated by historical, physical, or pictorial evidence.
7. Every reasonable effort shall be made to protect and preserve physical evidence of features previously removed, replaced, altered, or otherwise affected in the course of a vessel's history.
8. Chemical or physical treatments, such as sandblasting, that cause damage to historic materials shall not be used. The surface cleaning of vessels, if appropriate, shall be undertaken using the gentlest means possible.

Specific Standards for Treatment of Historic Vessels

The following specific standards for each treatment are to be used in conjunction with the general standards and, in each case, begin with number 9. For example, in evaluating acquisition projects, include the eight general standards plus the two specific standards listed under Standards for Acquisition.

Standards for Acquisition

9. Careful consideration shall be given to the type and extent of ownership rights that are required to assure the preservation of the historic vessel. The preservation objectives shall determine the exact rights of ownership to be acquired.
10. Clear title to a vessel shall be acquired when absolute ownership is required to ensure its preservation.

Standards for Protection

9. Protection shall safeguard the physical condition of a vessel from further deterioration or damage caused by weather or other natural, animal, or human intrusions.

10. If any historic material or features are removed, they shall be properly recorded and, if possible, stored for future study or reuse.

Standards for Stabilization

9. Stabilization shall reestablish the structural integrity of a vessel through the reinforcement of structural members or by arresting material deterioration leading to structural failure. Stabilization shall also reestablish weather-resistant conditions for a vessel exposed to weather, and watertight integrity for a vessel afloat.

Standards for Preservation

9. Preservation shall maintain the existing form, integrity, and materials of a vessel. Substantial restoration of missing features generally is not included in a preservation undertaking.
10. Preservation shall include techniques of arresting or retarding the deterioration of a vessel through a program of ongoing maintenance.

Standards for Rehabilitation

9. Alterations or additions to a historic vessel shall be undertaken only when such alterations or additions will not have a serious impact on the historic fabric of the vessel, and only when the alterations or additions are compatible with the size, scale, color, material, and character of the vessel.
10. Wherever possible, alterations to vessels shall be done in such a manner that if such alterations were to be removed in the future, the essential form and integrity of the vessel would be unimpaired.

Standards for Restoration

9. Restoration work shall be based upon verifiable historical, pictorial, or physical evidence, rather than upon conjecture.
10. Restoration decisions shall be made only after careful consideration has been given to the availability of substantiated historical information about the form and configuration of the vessel at the time to be represented by the restoration; the historical, cultural, and technological significance of the vessel in the period selected; and the degree to which the vessel's historic fabric will be affected by restoration to a particular period.

Appendix H

Meeting Minutes

Minutes are attached for meetings on the following dates:

- September 22, 2020
- October 21, 2020
- November 19, 2020
- June 7, 2021



CA Thayer Primary Issues – 1st Meeting Minutes

Participants

Lacey Bubnash, Sarah Hahn, Stacy Farr, ARG

Todd Bloch, Dave Brouillette, Lynn Cullivan, Jonathan Dille, Christopher Edwards, Bert Ho, Jeff Morris, Morgan Smith, Diane Cooper, Courtney Andersen, NPS

Project:

CA Thayer HSR

Project No.:

PMIS #197264

Meeting Location:

Microsoft Teams

Meeting Date:

September 22, 2020

Date of

September 24, 2020; Revised and Final – October 1, 2020

Distribution:

Item	Action By	Date Due
<p><u>Sailing Capacity:</u></p> <p>Overall consensus is to maintain sailing capacity for CA Thayer, but the park does not have budget or capability to run regular sailing trips at this time.</p> <p>ARG Recommendation: Maintenance and repair shall continue to maintain existing sailing capabilities, but no further design changes shall be undertaken to improve sailing capacity.</p> <p><u>Follow-up questions:</u></p> <p>There is concern about the vessel's condition for sailing in anything stronger than a gentle wind. Is future work needed to alleviate that concern? Should the vessel be ready for sailing for longer time periods or more frequent events, even if the Park's intention is to only sail back from dry dock visits?</p>		

<p><u>Accessibility:</u></p> <p>Overall consensus is that all forms of accessibility need to be improved at the vessel. Access to the main deck is the biggest priority; access to enclosed spaces could be provided via virtual reality or other equivalent facilitation.</p> <p>ARG Recommendation: Study methods of providing access from the pier to the main deck. Coordinate recommendations for future exhibit spaces with accessibility goals.</p> <p><u>Follow-up questions:</u></p> <p>Is access to any enclosed spaces needed? In particular, if events are held in the hold, disabled access is needed.</p> <p>What should access to the deck look like? Are there examples at other historic ships to look at?</p> <p>Does the walking surface at the deck require any improvement for safe access? What might that look like?</p>		
<p><u>Interpretation and Exhibits:</u></p> <p>There is consensus that some form of exhibits would benefit the visitor experience at the Thayer. More work is needed to identify exhibit topics and locations. Interpretation and exhibits should include all phases of the CA Thayer's career.</p> <p>ARG Recommendation: Pursue an interpretive program and exhibit design for the ship in the future. Refine Park goals for the exhibit content during future meetings.</p> <p><u>Follow-up questions:</u></p> <p>We need to further discuss what areas would be appropriate for the installation of permanent exhibits. If exhibits are in enclosed spaces, how do we provide accessibility to them? Does the ship have one overall exhibit (such as furnishings to a particular date) or can multiple careers be interpreted via separate exhibit areas?</p>		

<p><u>Programs and Activities:</u></p> <p>There was not universal support for any particular programs or activities on board. There is consensus that clearer rules/guidelines are needed for future events. Further discussion is needed to clarify if events will be allowed in the hold.</p> <p>ARG Recommendation: ARG does not have a recommendation at this time based on the discussion to date.</p> <p><u>Follow-up questions:</u></p> <p>What will program guidelines for the Thayer look like? How many people will be allowed on board at one time? Are there selected programs that the enclosed spaces could be optimized for? Would installing exhibits inside some spaces limit programming?</p>		
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These notes were prepared by Architectural Resources Group as a record of the substance of this meeting. These are notes only and are not to be construed as altering contractual agreements between parties. Please forward all comments and/or changes to the originator within two weeks.

By: Lacey Bubnash
E-mail: L.Bubnash@ARGSF.com
CC: meeting attendees, file



SAN FRANCISCO MARITIME NATIONAL HISTORICAL PARK

CA Thayer Historic Structure Report – Meeting #3 – Treatment October 21, 2020

Minutes Prepared by: Todd Bloch 10/22/2020

Attendees: Todd Bloch, Lynn Cullivan, Jeff Morris, Phil Erwin, Chris Edwards, Bert Ho (partial), Morgan Smith, Diane Cooper, Courtney Andersen

VIA: Teams video meeting

Item	Comment	Action
RESTORATIONS AND RECONSTRUCTIONS		
Further Restorations	<p>The following were proposed without objection:</p> <ul style="list-style-type: none">• Installation of the second worm shoe (as seen on Bendixsen drawings)• Removal, Replication and installation of the rudder (due to marine borer damage)• Eventual replacement of remaining historic material, centerline timbering (keel, keelsons, floors, lower frames, planking and ceiling).	
Main Cabin	<ul style="list-style-type: none">• The passageway in the main cabin (leading to the poop deck) should be closed and restored to original configuration (layout sketch by Capt. Lee)• Public access to the Poop Deck needs to be determined – i.e. safety concerns with low railings.	SAFR Management
Equipment	<ul style="list-style-type: none">• Windlass has been restored to operable and will be installed during the current haul out.• A reconstructed capstan is being assembled from parts of the original and parts of similar units, will be installed.• Anchors – should be installed, if ship can support the weight.• Donkey Engine:<ul style="list-style-type: none">- Important to interpretation of the ship- First priority is an operation engine- Second option is a facsimile of an engine• A determination should be made if the vessel can support the weight of an operation donkey engine and/or anchors.	ARG/ Tricoastal

Item	Comment	Action
Forward Cabin	<ul style="list-style-type: none"> Should be restored to configuration described by Capt. Lee. 	
Fo'c'sle	<p>Restoring the fisherman's fo'c'sle in the hold was debated; a brief summary being:</p> <ul style="list-style-type: none"> In favor of restoration - the fo'c'sle is important to the social history of the vessel; not including the fishing era in the period of significance was an oversight; seeing it in physical form is more effective than as an exhibit. In favor of not restoring – maintaining a fully open hold is important to understanding ships and ship building and has visual impact; the period of significance is 1895 and does not include the fishing era; we have an opportunity to present a vessel in its original physical configuration. <p>Other comments about the fo'c'sle;</p> <ul style="list-style-type: none"> Reconstruct the fo'c'sle in the museum or visitor's centers as a hands on experience Donate the parts to another organization (such as the Poulsbo Historical Society in Washington, which is related to CA Thayer's fishing history) <p>A final decision will likely need to be made by the park's senior management team.</p>	SAFR Management
Color Schemes	<ul style="list-style-type: none"> The bright "titanium white" that exists throughout the vessel is not period specific – such white did not exist. A cream color would be more appropriate (Victorian Cream?). There is evidence of further faux wood graining in the Captain's Salon (Dining Area has faux wood grain). This should be investigated further and a determination if such should be recreated. Interior painted wood elements believed to be original show multiple layers of various paint colors. These can possibly be stripped to reveal original colors – in scope of A/E consultant? 	ARG? ARG?
Furnishings	<p>A Historic Furnishings Plan is not part of the HSR, but consideration of what might be included may influence restorations on the ship. A scope for a future furnishings plan could be included in the HSR. Discussion included:</p> <ul style="list-style-type: none"> The CA Thayer was built and sold as a "ready-made" vessel – i.e. it came with all the equipment, tools, supplies etc. necessary to sail and operate the ship. This could be a model for setting up, furnishing and interpreting the ship. The foredeck should represent the lumber career Important to show the spare cabin as a children's area, particularly interpret the story of one of the captain's daughters. 	

Item	Comment	Action
METHODS AND MATERIALS		
Maintenance Access	<p>Access needs to be maintained for maintenance purposes. Several areas of concern were mentioned:</p> <ul style="list-style-type: none"> • Visitor access in the hold – i.e. a level platform/walkway would need to be removable. • A lift mechanism from the gangway to deck would need to be removable (and able to be installed on either side of the ship – seeing turning of the ship below) 	
Preventive Maintenance	<ul style="list-style-type: none"> • 4 year (minimum) haul-out schedule • 10 year cycle for spar replacement • Turn the ship in her berth at the return of each dry-docking. • Sails – off during rainy season; potential interpretive opportunity • Fresh-water exposure every 4 years between haul-outs – outreach experience on Sacramento River. Has cost and operational impacts – can park commit to this? 	SAFR Management
Electrical, Fire Suppression, Other Utilities	<p>The following was proposed without objection:</p> <ul style="list-style-type: none"> • Any system installed should not penetrate vessel components – no electrical chaseway drilled through hanging knees as was done in the past. • A wireless fire detection and enunciation system should be installed similar to Balclutha's and report to a central panel in the multipurpose building or ticket booth. • Bilge alarms should be part of the fire detection system as well. <p>Fire suppression was discussed but was inconclusive due to challenges of installing a system in an operable, sailing historic vessel. Is there potential for "localized" fire protection – i.e. without physical pipes etc. throughout the ship?</p>	ARG/Tricoastal?
Alternate Treatments and Materials	<p>For compliance reasons, we should codify where and under what circumstances we would:</p> <ul style="list-style-type: none"> • Use alternative materials when replacement in kind is not possible – specifics: <ul style="list-style-type: none"> - Purple heart wood in lieu of exotics that are no longer legally available - Laminated spars and large wood components in lieu of grown timber due limitations in timber sizes - Types of line and rigging - Other? • Change/modify/replace elements as further historical research indicates – specifics: <ul style="list-style-type: none"> - Paint colors - Shape of gaff and boom jaws - Replacing fittings with actually forged pieces - Replacing spars with grown timber as possible 	SAFR – F&S/CR

Item	Comment	Action
Other	<ul style="list-style-type: none"> Keep hatches and doors closed with something to keep raccoons out There are two sets of lumber ports, one for ventilation and one that is a historic reproduction. Clarify which ones are to be used when and why. 	SAFR – F&S

Next Meeting

November – TBD

Attachments:

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SAN FRANCISCO MARITIME NATIONAL HISTORICAL PARK

CA Thayer Historic Structure Report – Meeting #4 – Use November 19, 2020

Minutes Prepared by: Todd Bloch, 12/7/2020

Attendees: Todd Bloch, Jeff Morris, Phil Erwin, Chris Edwards, Bert Ho, Morgan Smith, Courtney Andersen, Jonathan Dille

VIA: Teams video meeting

Item	Comment	Action
Storage of Maintenance Supplies	<p>The team discussed the merits of using the vessel for storage of equipment and supplies related to routine maintenance of the vessel. The consensus was that some materials could be stored on board if they could be concealed from view so as not to interfere with the historic presentation of the vessel. Points discussed:</p> <ul style="list-style-type: none">• If a bosun's locker is identified as a space on the ship, this could be used for materials.• The aft lazarette was considered but ruled out due inadequate access.• Use of the entire donkey engine space for storage (until a donkey engine is installed) was discussed but ruled out. It was preferred to keep this area available for interpretation of the donkey engine.• However, it was noted that there could be lockers or other areas in the donkey engine area that could be used for storage. Build-out of the donkey engine area should include an effort to find storage spaces.• Fitted out spaces, such as the aft cabin, area should not be used for storage due to the potential for damage when moving materials in and out.• A cabinet on the pier should be provided for additional storage.	

Item	Comment	Action
Exhibits and Interpretive Use	<p>The nature of interpretation and exhibits was largely discussed during the primary issues meeting. Several points were reiterated with a consensus to use these as guides for future development:</p> <ul style="list-style-type: none"> • Interpretation of the vessel, its history and use are important and should be provided to visitors. • Any interpretive panels should not be intrusive, interfere with operation/maintenance of the vessel and should be integrated. • In summary, keep it looking like a ship. • The ability to conduct practical demonstrations of the operation of the ship and its equipment should be provided. 	
PROGRAMS, ACTIVITIES AND EVENTS		
Occupancy/Capacity	<p>It was noted that the range of activities on board will be governed by input from the Regional Fire Marshal, the Authority Having Jurisdiction (AHJ) over the vessel. Given that occupancy/capacity will in part be determined by the number of exit routes from the lower hold, it was concluded that two means of exiting should be established from the hold – one via each of the hatches. A future project should consider how to best install stairs with minimal impact to the historic character of the vessel and operational (sailing) needs.</p>	
Accessibility Limitations	<p>The currently lack of accessibility to the main deck and lower hold were noted as limitations to conducting certain activities aboard. For example, Sea Chanty events in the lower hold would not be acceptable since wheelchairs can not access that space. Similarly, overnight sleeping programs would not be able to provide an equal experience if sleeping accommodation is in the hold. Future events will need to consider accessibility.</p> <p>If the lower hold is opened to the public and is not accessible, a programmatic alternative needs to be provided. If a future project is developed to create the aforementioned access stairs to enable public access, that project should probably also include funds for a programmatic solution.</p>	
Overnight Programs	<p>Overnight sleeping programs would currently not be able to provide an equal experience if sleeping accommodation is in the hold.</p> <p>In general, the various bunk spaces in the deck cabins/houses could be used for small group overnight programs.</p>	

Item	Comment	Action
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Consideration will need to be given potential impacts on display, historic furnishing plans etc.

Parameters and Guidelines

There was consensus that rather than define what activities can and cannot be allowed on the vessel, parameters should be established and/or outlined. Several parameters were discussed:

- Food – see park policies
- Electrical – the electrical supply will only be sufficient to provide power to lighting, monitors, alarms etc. and not have capacity for additional equipment. Consensus was that use of additional shore base temporary electrical power should not be accepted.
- Receptions – see park policies

Program guidelines for events and activities that are not part of the operation or interpretation of the ship (food service, sleeping, receptions etc.) will be outlined in the park's use policies (which also cover other vessels and structures).

Next Meeting

December – TBD

Attachments:



SAN FRANCISCO MARITIME NATIONAL HISTORICAL PARK

CA Thayer Historic Structure Report – Meeting #6 – Outstanding Issues

June 7, 2021

Minutes Prepared by: Todd Bloch June 11, 2021

Attendees: Todd Bloch, Jeff Morris, Dave Brouillette, Chris Edwards, Bert Ho, Elizabeth Pigeon

VIA: Teams video meeting

Purpose: The purpose of the meeting was to address items from previous meetings that had not been fully resolved, reach decisions about these items, and provide direction to the HSR consultant. These decisions supplement what has been determined in previous meetings.

Item	Comment	Action
Sailing	<p>The team determined the following:</p> <ul style="list-style-type: none">• <i>CA Thayer</i> will not be sailed on a routine basis or have a “sailing program.”• <i>CA Thayer</i> will not be maintained as, or modified to become, a US Coast Guard approved passenger carrying vessel.• <i>CA Thayer</i> should be maintained in a state that allows sailing when she is taken to/from dry dock. This will necessitate a period of preparation prior to leaving the dock/pier. Other than bending on sails, adding rigging etc., the preparation should not be significantly more complex than the standard dry docking preparation.• “Sailing” in regard to <i>CA Thayer</i> means raising a limited amount of sail, crew limited to staff and volunteers and a duration of several hours in light winds. Strong winds or currents may cancel sailing. <i>CA Thayer</i> will be escorted by one or two tugboats.• Sailing will likely not be possible until portions of the keel, floors and framing at the bottom of the hull are restored. A naval architect will need to be consulted.• While pier-side, in regard to visitor experience and interpretation, <i>CA Thayer</i> should be presented as a “sail ready” vessel.• Clarity on the sailing intentions crucial to future operations on the vessel; a summary of the above should be included in the HSR introduction.	

Item	Comment	Action
Disposition and Configuration	<p>The team determined the following:</p> <ul style="list-style-type: none"> • CA Thayer will be presented to recreate the “ready-made” status of when she was launched – the vessel included all equipment, furniture, tools, supplies etc. • Future projects related to configurations, historic furnishings and interpretation should support this approach - cabin spaces should be furnished and fitted out per period. • Interpretation panels should be non-intrusive. • The bulkhead in the aft cabin passageway will be restored. • Aft cabins (1st and 2nd mates) should be restored. • The park should confirm how occupancy limits within the aft cabin area will be managed – i.e signage, staff monitored etc. • The fisherman’s fo’c’sle will not be reinstalled (status of parts should be confirmed with Collections – add to Collection?) 	
Exiting, Visitor Access and Occupancy	<p>The team determined the following:</p> <ul style="list-style-type: none"> • Two means of exiting should be established from the hold – one via each of the hatches. A future project should consider how to best install stairs with minimal impact to the historic character of the vessel and operational (sailing) needs. • No self guided public access to the poop/foredeck and cabin deck – guided tours only. • Visitor access to the forward cabins should not be decide at this point. Access will be determined at a future time when a historic furnishing plans informs if it reasonable to open the areas to visitors. 	
Accessibility	<p>The team determined the following:</p> <ul style="list-style-type: none"> • Access to the Main deck is a priority, but a creative solution must be found that does not require permanent impact to ship. • Permanent impact would include bolt holes/fastenings, and alterations to the bulwark, rail or hull. • Alternate means (beyond a lift on the deck) of physically access the main deck should be investigated further by the HSR consultant. These may include hoist systems similar to those used a swimming pools. • Access to the Hold will not be possible, rely on programmatic solution. 	

Item	Comment	Action
Fire Protection	<p>The team determined the following:</p> <ul style="list-style-type: none"> • Fire protection is desired in the ship • Alterations/penetrations in order to accommodate a fire protection system are not acceptable. • Alternate means (beyond a piped sprinkler system) of providing fire protection should be investigated further by the HSR consultant. 	
Documentation	The HSR should document that the above issues were considered of particular importance to the park and are critical to how the park envisions the treatment and use of the vessel.	
Capstan	The current capstan is an artifact that will be returned to Collections. A replacement capstan assembled from various parts has been prepared to replace the current capstan.	

END OF MINUTES

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